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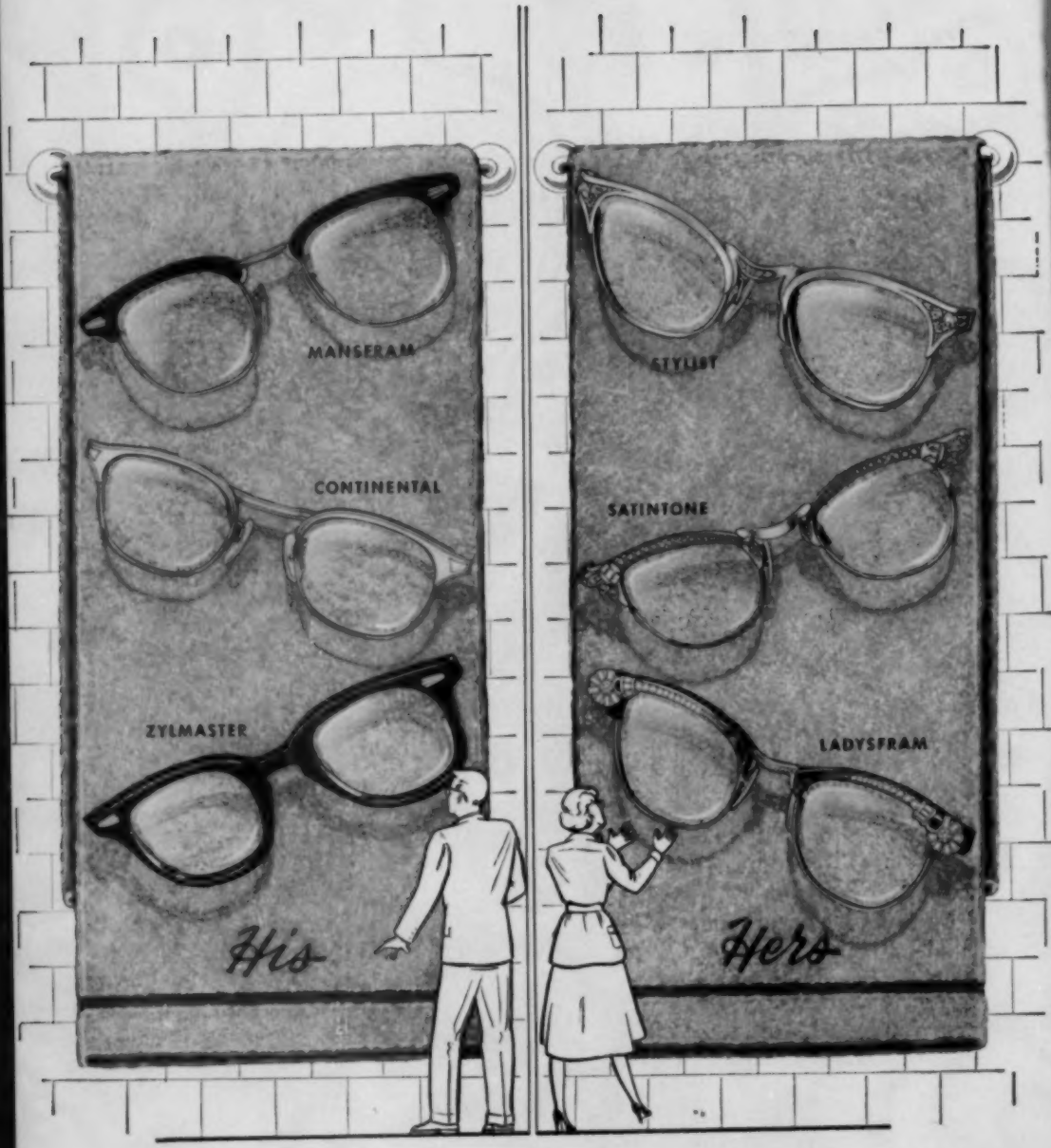

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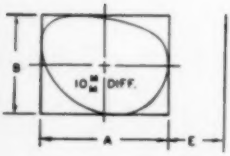

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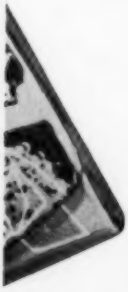

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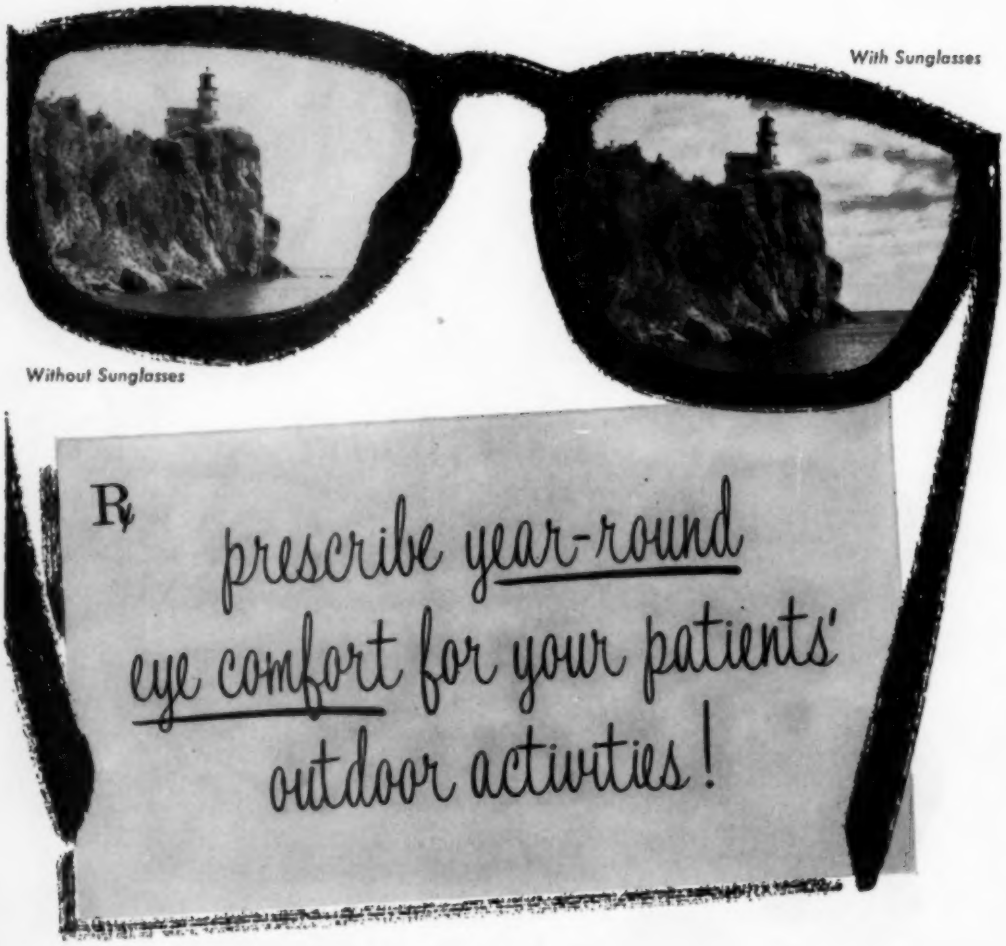

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NOTES ON TECHNIQUE IN PERIMETRY*

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One of the most valuable aids available to the ocular practitioner is the use of perimetry. In certain disorders such as intracranial tumor, the *only* evidence of impairment may be that obtained by visual field examination. In other cases, where the pathology is known, repeated field studies can assist in illustrating the increase or decrease of visual impairment.

The examination of the visual field is a probing of the conductivity of the visual nerve mechanism. Interruptions of conduction can be detected and explored through field examination. It should be obvious that the most careful ophthalmoscopic examination and refraction cannot yield complete information about visual conduction, unless the fields, also, are charted.

This paper is not intended to be a treatise on perimetry. The subject has been well covered in many books and articles, and the reader is urged to acquire theoretical background from these works. This writer is especially indebted to the writings of the late H. M. Traquair, of whom it has been said, "To know perimetry is to know Traquair." We shall attempt to present a guide to technique in perimetry for the busy practitioner.

The question immediately arises, what sort of equipment should one possess for adequate field testing. The following list will meet most requirements:

1. Tangent screen (1 or 2 meter)
2. Perimeter
3. Lloyd stereocampimeter
4. Harrington-Flocks multiple pattern visual field screener

If one could at first have but one piece of equipment, the tangent screen should be selected. The perimeter, as the second piece of equip-

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ment, essentially rounds out the equipment necessary for complete field examination. With a screen and perimeter one can completely explore the visual fields, both central and peripheral.

The Lloyd stereocampimeter is valuable in those cases where central vision has been lost in one eye, and fixation for that eye is difficult, if not impossible. With the two eyes fixing binocularly it is simpler to plot the central scotoma of the defective eye.

The Harrington-Flocks multiple pattern test is a useful screening device, but by itself would lie somewhere between gross confrontation and careful tangent screen examination, although closer to the latter. It has further uses, however: it may be of additional advantage in nystagmus, it may also be used where cooperation is exceedingly difficult and unreliable (sometimes the reverse is true, and where responses are slow, the tangent screen may yield more reliability) and in some functional field restrictions the multiple pattern test may reveal more normal responses because the test *differs* to the patient from the tangent screen examination. The multiple pattern test can easily be given every patient as part of a routine ocular examination.

Screening devices have a definite value in mass examinations and, within limits, as clinical instruments. The detection of slight defects, slight as to size or density, or both, depends upon careful quantitative field testing. Repetitions of field examinations for the purpose of studying changes of contour and density are based on the quantitative method. The value of screening instruments is appreciated, but the limitations of such devices must be recognized.

For the tangent screen or perimeter, test objects should be circular and flat. This enables the examiner to turn the wand and present the edge of a target to the patient in order to illustrate the disappearance of the object, or to test the validity of the patient's responses.

White test objects of ½, 1, 2, 3, 4, 5, 7.5, 10, 15, 20, 30, and 40 mm. in diameter will meet most requirements. Colored test objects of 2, 3, 5, 10, 15, 20, 30, and 40 mm. will suffice. In field testing, white, red, green, and blue objects are used; white and red are most commonly employed.

The size of a test object is expressed by a fraction in which the numerator is the diameter of the target in millimeters, and the denominator is the distance in millimeters of the screen or arc from the eye of the patient.

Illumination of seven-foot candles on the screen or perimeter is a generally accepted standard. Close adherence to this standard may not be essential, but it is advantageous for the comparison of test results

with later field chartings or with those of other examiners to have test conditions similar. It is necessary that the illumination on the instruments be uniform.

There are many strong proponents of the use of colored test objects in routine testing. The author is not among them, but this is not to deny the usefulness of color in testing. However, the use of a graduated series of white test objects, especially the smaller sizes, should indicate the existence and density of field defects. For some patients, color is an elusive, subjective, and unreliable factor; for others, colored objects may indicate scotomata quickly and easily. In the beginning, it would seem advisable to achieve a technique with white targets only.

Tangent screen: Although the most sensitive instrument is the two meter screen, the clinically most useful is the one meter screen. It is small enough for the examiner to cover easily, efficiently, and comfortably, and yet large enough to yield accuracy. Further, due to limitation of space in most private, clinical or hospital facilities, the one meter screen can be more easily situated. The concentric circles on the screen should extend to 35°. Preferably, no screen should be smaller than a one meter screen.

The size of the targets selected for use depends upon the case. Our statements here on norms are not in complete agreement with the statements of most authorities on field testing, being somewhat less than those stated by others. Clinically, most normal individuals will easily see 2/1000 white over the entire screen out to the 35° circle, with the exception, of course, of the blind spot. The lower limit could be accepted as 30°. For a 1 mm. white (1/1000) target, from 30° down to 20° would be acceptable. In a normal field, the blind spot should be well within the 1/1000 isopter.

Where no gross defect is known to exist, careful examination with a 2/1000 white over the entire screen, followed by further examination with 1/1000 white, should be a fairly complete test. Examinations within the 10° circle, using ½/1000 white is a finer test for paracentral and pericentral defects. In examining the area of fixation and directly around it, it is useful to move the patient back to two meters, using a 1 mm. white target. This expedient provides a sensitive two meter test, using a one meter screen. Using 1/2000 white target around the fixation area is often a more sensitive exploration than using a ½/1000 target.

If the eyes are dissimilar it is generally best to examine the better seeing eye first. The procedure then should be as follows: explain briefly the nature of the test to the patient and instruct the patient to

answer "yes" when he sees the target, and "no" when he does not, and to respond instantly. The patient looks directly at the fixation object (the size of fixation object depends upon the patient's visual acuity: for most patients a 2 mm. to a 4 mm. white object will do), the 2/1000 white test object is then moved from near the fixation object toward the blind spot. The rate of speed should be slow, but the rate is a factor which one learns from experience and which should be geared to the particular patient. In addition to moving the target laterally, the target should also be moved in a short up and down direction at the same time. The blind spot should be plotted first. In plotting the normal blind spot, and in mapping any scotoma, the target should be moved from seeing to disappearing, and from disappearing to seeing, and the mean should be marked with a pin.

After plotting the blind spot, a method for covering the entire screen could be the following: as most screens are also marked with stitching radially in 22½° intervals, and one can start near fixation and work out to the 35° circle with a 22½° section, using gradually widening excursions perpendicular to the radius as one goes outward. A centripetal movement with consequent narrowing excursions in the adjacent 22½° radial section returns the target to fixation, and so on around the screen until the entire screen has been covered. In this manner, the boundaries of the field are noted and the area within is well explored. A similar procedure can be followed with a 1/1000 white target, but more slowly; and lastly, ½/1000 white can be used within the 10° circle. Many patients seem to respond more reliably and to understand the test more quickly if the 2/1000 white test object is used before the 1/1000 white.

At the conclusion of testing in clockwise fashion with 2/1000 white, a further examination for defects near fixation and around the blind spot should be made. The same should be done with 1/1000 white. Traquair states, "The object should be passed several times vertically across the area between these two points (fixation area and blind spot) to exclude arcuate and centrocaecal defects, and the field immediately above and below the horizontal meridian on the nasal side should be examined to exclude Roenee's nasal step."[1]

Frequently, patients, especially elderly individuals, have difficulty in responding accurately to the 1/1000 white target. More than one examination may be necessary for satisfactory results. A contraction of the 1/1000 white isopter is not always an indication of impairment.

[1]An Introduction to Clinical Perimetry. H. M. Traquair. (By courtesy of Henry Kimpton, British Publisher.)

Some patients are simply not good subjects for field testing. The patient's degree of alertness or apprehension must be evaluated.

Traquair and others believe in avoiding adherence to a fixed routine. The method suggested in this paper is presented as a starting procedure in field testing, not as an unalterable routine. Adaptations depend upon the examiner and the patient. In poorer vision, or with poor cooperation, it may be easier to begin with a larger test object, say 5/1000 or 10/1000 white.

In some instances it may be informative to examine a suspicious area with a larger white target under reduced illumination.

The specific case may indicate the procedure. The method of systematically going around the screen in neat sections may be abandoned as soon as a scotoma is evidenced. It then becomes more feasible to establish the contours of the scotoma and its extension, but in all cases the entire screen should be covered.

For a difference in visual acuity between the two eyes, it should be possible to demonstrate the difference upon the screen. Where vision is, say 20/80, the 1/1000 target should disappear completely at fixation. Where central vision is very poor, it may be necessary to pin about eight white pieces of paper, about 1 cm. in diameter each, around 10° or so from fixation (or just containing the central scotoma), and direct the patient to look within the center of the circle, although he may not see the center fixation target.

At times it is advisable to have a larger fixation object in poor vision. At other times, a fixation object the size of a pinhead is useful in demonstrating very slight impairments in acuity, say 20/30 or 20/40. In this case, a test object as small as ½/1000 white will be helpful in illustrating the pericentral scotoma. The term "pericentral" is taken from Traquair, and refers to a scotoma which more or less uniformly surrounds and includes fixation. The use of a 2 mm. fixation object at two meters, with a 2/2000 red or 3/2000 red test object immediately around fixation, frequently demonstrates slight pericentral impairments easily.

When a scotoma is found, it is of importance diagnostically, and for future studies and test comparison, to state the density of the defect. For example, one can note under remarks on a field chart, "The shaded area represents dim perception of 20/1000 white, but is out for 10/1000 white."

Usually, the use of three or four test objects will suffice to demonstrate the important features of the condition of the central field.

As stated previously, the writer requests his patients to answer

"yes" or "no" in field testing. There are many examiners who use a tap or a cricket as a signal device for the patient. The writer uses the verbal method exclusively.

It is suggested that the examiner keep questioning the patient during the examination: "Do you see it now?" . . . "Do you still see it?" . . . "Do you see it yet?" . . . "Tell me when you do see it!" . . . Also, it is recommended that the examiner frequently turn the target so that only the edge is presented, or hide the target behind the screen on occasion to check upon the patient's alertness and cooperation.

The reason for the verbal response is that communication is better maintained this way. The patient may say, "Yes, I still see it, but it seems a little dimmer," or "I'm not sure whether I see the white spot or your stick." In any case, it is important to have good communication with the patient. Visual field testing demands it, and clues cannot be overlooked.

In all field testing, the examiner must frequently observe the patient's eye to check on steadiness of fixation.

Perimeter: A preferred perimeter size is that with radius of 330 mm. For patients with good vision, the most commonly used test objects are 2/330 and 3/330 white. For patients with poor vision, and in order to demonstrate the density or relativity of a defect, larger targets will be required.

The approximate figures for the lateral and vertical boundaries of the normal average field of each eye are: nasally 60°, temporally 85° to 95°, upwards 55°, downwards 65°.

The mechanical target carrier on the perimeter is not particularly desirable. The following technique is recommended: the target is on a wand as with the screen, and is brought manually from beyond the visual boundary to the area of perception, at which moment the patient says, "yes." The target should be moved in along the arc slowly, and at a steady rate. As with the screen, slight movements perpendicular to the line of direction are helpful. The advantages of a manual target are that it is noiseless and can be moved in any direction. This latter point is of value in establishing the contour of a defect, and in checking suspicious areas. After the patient has reported seeing the target make its appearance, the target is nevertheless brought right up to the fixation point and the patient is directed to answer "no" if it should disappear or grow dim along the way. Placing the target at the blind spot in the beginning can show the patient what is meant by a disappearing object. It is insufficient to merely indicate the outer isopter of a target. Mapping the *whole* field is most essential, for example, the frequent ring scotoma

of retinitis pigmentosa could not be elicited without covering the whole arc with the target. The perimeter arc should be rotated in 15° steps until the whole field has been covered. This may be painstaking, but certainly no greater than 30° steps should be used. Generally, the best and most accurate results will be obtained in 15° steps.

In using the screen and perimeter, it is frequently necessary to raise the patient's eyelids or a false depression of the superior field results. In addition, a patient with a very large nose should be requested to turn his head slightly toward the left when the examiner is testing the nasal field of his right eye, yet keeping his gaze directed at the fixation point.

The writer usually has the patient wear his distance glasses for the screen test, and no glasses at the perimeter.

Patients with high hyperopia or aphakia should wear spectacles for the screen test, but may be requested to turn the head slightly, yet maintaining fixation, because the field in high hyperopia is necessarily limited by the nature of the prescription. Without slight head turning, the field would appear constricted.

The patient wearing bifocal spectacles may, in exploration of the lower central field, be requested to lower his head slightly while maintaining fixation, so that the blur and displacement of a strong bifocal segment may be shifted beyond the central field.

There are other defects encountered in field testing which are not the consequence of an organic lesion of the visual pathway. These are the functional disturbances. In hysteria, for example, a tubular field is common in which a severe constriction will have the same linear measurement no matter at what distance the patient is placed from the screen. Moving a patient back to two meters and then three meters from an original distance of one meter will not result in a linear expansion on the screen as one would expect in an organic constriction. Psychic interference with a field test can also yield spiral fields, generally coming closer to the point of fixation as the test proceeds. Any inconsistent pattern should make the examiner wary of a functional disturbance.

Several young adolescent girls have been seen in our clinic in which complaints of headache and visual disturbance were coupled with either tubular fields, spiral fields, or great inconsistency of fields. In some of these Snellen acuity was also somewhat diminished. On subsequent occasions, Snellen acuity was normal. In some of these cooperation and responses right around fixation were good with 1/1000 white and even ½/1000 white. Then the examiner could conclude that visual acuity was actually much better than recorded. This subsequently proved to be so, sometimes immediately following the field test. Frequently, in func-

tional impairments, suggestion will restore both visual acuity and integrity of fields in a matter of minutes.

A helpful technique in suspected functional disturbances is to change from one type of instrument to another, from the tangent screen to the Harrington-Flocks or to the perimeter. The inconsistencies may become more apparent by this means, especially where cooperation is difficult to obtain.

Another factor which we must consider in visual fields is the perimetrist himself. Aside from a knowledge of anatomy and pathology relating to fields, the personality of the examiner is of importance. The examiner must have understanding and patience, and yet have a quality once described by the writer's commanding officer in World War II as a requisite for officers as "command presence." Traquair quotes Roenee, who wrote, "It is a peculiarity of perimetry that its outward technique is so simple as apparently to make no demand, but to be feasible for the least experienced assistant of a clinic, and yet of all ophthalmic examinations, it is perhaps the one which in reality requires the most experience and detachment."[2]

The examiner must be aware that he can "create" a field defect in a suggestible patient.

In elderly or debilitated patients who fatigue easily, sometimes the field commences constricting on a functional level.

In any doubtful or functional cases fields should be repeated on other occasions.

It is helpful on all field charts to note the type of cooperation of a patient: good, fair, poor, extremely unreliable. In some patients with poor responses later examinations yield good responses.

Brodie Hughes, a British neurosurgeon, states, "Testing the visual field is somewhat similar to testing other forms of sensation. It cannot be done by a machine or by someone ignorant of the facts of human anatomy or pathology. The patient's responses have to be interpreted at the time they are recorded by the examiner who is thinking in terms of the normal and pathological field. He will need, therefore, to alter his methods of testing as the examination proceeds. He will need to vary the methods of presentation, size, and colour of test objects and degree of illumination in order to emphasize doubtful defects, or confirm the normality of a given area of the field."[3]

Visual field testing is sometimes of great value to ophthalmology.

---

[2]Ibid.

[3]The Visual Fields. Brodie Hughes. (By courtesy of Charles C. Thomas, Publisher.)

If we will admit the possibility of human error in ophthalmology, and that sometimes early pathological processes in the choroid or retina can be overlooked in patients with vague symptoms, then it will be seen that visual fields can be of help. If a field defect is discovered, then the examiner can project back to the expected site in the fundus and detect ophthalmoscopically what had been previously passed over.

In large ophthalmic clinical facilities, there is sometimes a tendency to make visual field examination the province of one or two individuals; that is, there is a tendency for some individuals to specialize in perimetry. There would seem to be no objection to this practice: it is very likely an advantageous arrangement. Although it behooves all members of the ophthalmic professions to achieve a good grasp of and proficiency in field testing, some individuals, through experience and interest, seem to cultivate a special skill in this work. In a busy clinic it is of value to have special hours set aside for perimetry so that the specialist in perimetry may have the proper time and atmosphere conducive to best results. Such an arrangement usually leads to an increase in the number of patients who will have field examinations. It is a simple matter for the examining doctor to refer any doubtful case to the perimetrist and be assured of a high standard of field examination.

Finally, the obvious should be stated: Experience is essential in perimetry. The field examination of large numbers of patients brings a satisfying development of proficiency. More frequent, skillful use of perimetry will enhance ophthalmic service.

GENERAL REFERENCES

Harrington, David O., and Flocks, Milton: Multiple Pattern Method of Visual Field Examination. "The Journal of the American Medical Association," February 19, 1955, Vol. 157, No. 8, pp. 645-651.

Hughes, Brodie: The Visual Fields. 1954. Charles C. Thomas, 301-327 E. Lawrence Avenue, Springfield, Illinois.

Peter, Luther C.: The Principles and Practices of Perimetry. Fourth Edition 1938. Lea and Feibiger, Philadelphia.

Rucker, C. Wilbur: The Interpretation of Visual Fields. 1954. American Academy of Ophthalmology and Otolaryngology.

Sugar, H. Saul: The Glaucomas. 1951. The C. V. Mosby Company, St. Louis, Mo.

Traquair, H. M.: An Introduction to Clinical Perimetry. 1949. Sixth Edition. The C. V. Mosby Company, St. Louis, Mo.

Walsh, Frank B.: Clinical Neuro-Ophthalmology. 1947. The Williams and Wilkins Company, Baltimore, Md.

Zuckerman, Joshua: Perimetry. 1954. J. B. Lippincott Company, Philadelphia, London, Montreal.

A QUALITATIVE AND QUANTITATIVE METHOD FOR SCREENING ANISEIKONIA*

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INTRODUCTION

"Every patient who shows a difference of one-half diopter or more between the powers of the cylinders in his correction, or a difference in axis between these cylinders amounting to 15 or 20 degrees will have aniseikonia." So stated Dr. Harold Fisher in a recent lecture at the Department of Optometry, Columbia University, New York City. It is evident from the above statement that the examination for, detection of, and ultimate correction of significant amounts of aniseikonia might very well be underestimated in the practice of optometry today, much like the importance of the examination for, detection of, and ultimate correction of astigmatism was underestimated fifty years ago.

Although the systematic study of aniseikonia as a factor in the production of asthenopia and poor binocular vision is relatively new, dating back only about twenty years, this problem of unequal and distorted perceived images, and curved and tilted fields, has a much longer history.

In 1864, Donders discussed unequal perceived images in his classic, "Accommodation and Refraction of the Eye." In 1875, O. F. Wadsworth[1] produced unequal perceived images by holding a concave cylinder before one eye. Eight years later he wrote a paper[2] on the apparent curvature of field produced by prisms, pointing out that a flat surface viewed through a plane prism appears curved, base-in prisms causing the surface to appear convex to the observer and base-out prisms causing it to appear concave.

Lippincott, in 1889, described the effect of placing plus and minus spheres and cylinders before the eyes. In 1914, Erggelit stated that absolute equality of perceived images could never be obtained in corrected

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†A study made while the authors were senior students. All are now optometrists in practice.

An abridgment of the material which received the New York Academy of Optometry award for the best student research of the year 1955-1956 at the School of Optometry, Columbia University.

anisometropia, but that in the majority of cases the patient could become used to the correction.

After World War I, the systematic study of aniseikonia began. In 1927, Cattaneo pointed out that the sizes of the perceived images could be equalized in anisometropic corrections by adjusting the distances between the individual correcting lenses and the cornea. A little over twenty-five years ago instruments and techniques for measuring differences in perceived image sizes were developed. Much of the credit goes to Ames and his colleagues at the Dartmouth Eye Institute. They studied variations in tolerance of various size differences; designed and ground iseikonic lenses; and collected an abundance of clinical data which substantiated their claim that aniseikonia may cause asthenopia, in which case relief cannot be obtained by any means other than iseikonic lenses.

Since that time, instrumentation has been constantly improved. Since this paper is concerned with instrumentation only as a screening device, the reader is referred to the literature for the history and description of the many types of eikonometers in use today, as well as the definition and principles of magnification involved in aniseikonia.

Although there are eikonometers in use today which can accurately measure the amount and kind of aniseikonia present, very few practitioners have availed themselves of these instruments. One of the reasons for this is the relatively high cost of these instruments. Whereas many practitioners would welcome the opportunity to be able to test for aniseikonia in a patient in whom the possibility strongly exists, there remains the very practical problem of not having an accurate, inexpensive, qualitative and quantitative technique for its detection. As a result, many practitioners tend to attribute asthenopia and binocular difficulties too often, and to no avail, to many reasons other than the one true reason in so many cases—aniseikonia. This is borne out by the fact that it was possible to relieve discomfort in over seventy per cent of the cases where iseikonic corrections were required and supplied.[3]

Because of the importance of the problem, many attempts to design a screening device have been made. In 1937, Allen[4] described a test for aniseikonia, using central fixation and fusion. A stereoscope was used with rotary prisms and size lenses. Only overall corrections were attempted. The test was uncertain below one per cent, but accurate above.

Elvin[5], in 1949, measured one overall case, using the combination of six plane lenses as a size lens. The infinity balance technique, using an occluding screen, was employed. Actually, this was not a true screen-

ing device. In 1951, Brecker[6] utilized the principle of diplopia using maddox rods and muscle lights. However, in addition to the requirement of a special set-up, the use of size lenses was mandatory.

Two screening devices made their appearance in 1952. Charnwood[7] devised a rough, diagnostic test. Cards were used in a stereoscope which were designed to measure 2% axis 90, 4% axis 90, 15′ declination, and 45′ declination. In addition, there was a normal card. Gold and his colleagues[8] in the same year designed a mechanical eikonometer at Columbia University using the principle of the Standard eikonometer with polaroids. Actual mechanical changes in the horizontal and vertical meridians only were made in the target used, instead of creating differences with size lenses.

Pine designed cards for use in a stereoscope which "when used as suggested will guard the refractionist against prescribing lenses which will cause unlike retinal images." However, only size differences without reference to amount were indicated.

In 1953, a second study was made at Columbia University. Harris and his colleagues[9] drew reproductions of the space eikonometer target to represent various magnifications. These in turn were photographed and viewed in a stereoscope. Cards were made representing 1%, 2%, 3%, 4%, and 6% axis 90; 2% and 4% axis 180; and 4% axis 45. The declination was not a true measure, and the mean was indeterminable. The sensitivity of the axis 90 and axis 180 cards was reported as one per cent. Due to construction, some cards had more or less magnification than was intended. In 1955, Malin[10] constructed a simplified space eikonometer for the measuring of aniseikonia, utilizing a phorometer modified to accept size lenses.

In spite of all previous attempts to design an acceptable aniseikonia screening device, very few are actually in use today. This is a result of many factors. Many used size lenses which in effect makes the instrument nothing more than an eikonometer. Others used a hand stereoscope as a viewer, incorporating, of necessity, all the aberrations and distortions which in themselves can cause aniseikonic responses. Most took no account of brightness control, abolition of peripheral fusion, maintenance of head position, and other important parameters which must be controlled if accuracy and reliability are desired.

With these factors in mind, the design of a new qualitative and quantitative screening device was undertaken.* A set of twenty-one

*EDITORIAL FOOTNOTE: The idea of devising a screening or simplified test for aniseikonia was developed in 1944 at the Dartmouth Eye Institute. At this time a simplified space eikonometer (Vectograph Model) was developed. This instrument was described

stereo slides of the space eikonometer were made for use in a standard type stereo viewer for measuring amounts of aniseikonia from 0% to 4% axis 90 and axis 180, and up to ± 0.86 degree declination. A comparison was then made between the measurements obtained by the use of these slides and by the use of the Office Model Space Eikonometer upon subjects in whom varying degrees of aniseikonia were introduced. Results showed that by the use of these slides, axis 90 and axis 180 can be measured to within approximately 0.50% of the measurements obtained with the Office Model Space Eikonometer. Declination measurements tend to be less conclusive with both instruments showing the same general trend.

APPARATUS

Production of the slides used in this screening device involved the photographing of a space eikonometer target by means of a stereo camera. The target used for this purpose was a model of the original space eikonometer target, placed before a uniformly black background. The essential parts of the target consisted of an oblique cross made up of two white cords stretched at right angles to each other from opposite corners of a three-foot eight-inch square, with a single white string suspended through the center of the cross; two pair of vertical white plumb cords, one pair 1.33 feet in front and the other 1.33 feet behind the cross, each with a lateral separation of 8.0 inches, as shown in Figure 1. The thickness of the strings used was 0.079 inch.

The center of the target was placed 4 feet from the camera so that the front strings would subtend a visual angle of about fifteen degrees in the camera. This corresponds to a visual angle of about twelve degrees when viewing the slides in the viewer to be used in conjunction with these slides. This is due to the ratio of focal lengths of 35 to 45 mm. between the lenses of the camera and viewer respectively, and is approximately the same visual angle subtended by the front strings in the original space eikonometer.[11]

The camera used was a Stereo Realist, Model ST-41, with matched

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in a Manual of Instructions published by The Dartmouth Eye Institute, Hanover, New Hampshire, and was dated 1944. The author was Robert J. Beitel, Jr. Test targets based upon the standard eikonometer were prepared in the form of vectographs and were presented to the two eyes through appropriate poloroid filters. The only major difference between this earlier screening device and the one here described was that the earlier model utilized a vectograph and poloroid whereas the one here described uses a stereoscopic viewer and stereogram. The earlier model was a valid test but was not successful due to technological difficulties in the construction of vectographs. It well may be that these difficulties have been overcome in the present model, and the present authors may have found a successful screening test for aniseikonia, a much needed development.

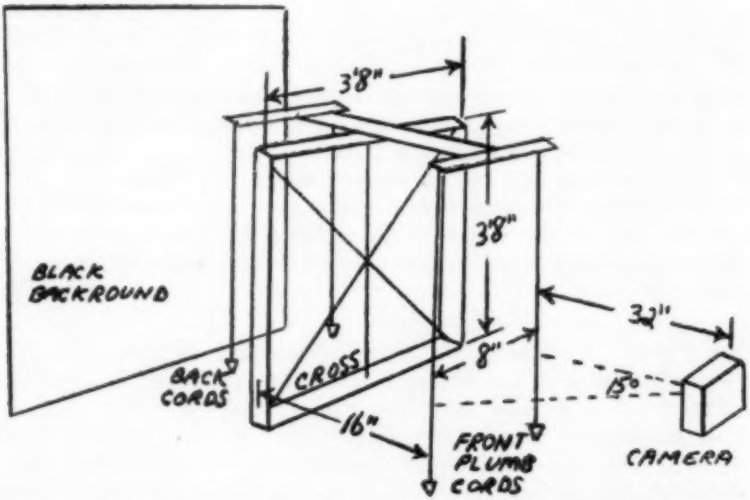

Fig. 1. Schematic diagram of space eikonometer target photographed. (After Bannon, Clinical Manual on Aniseikonia.)

triple element 35 mm. lenses. It was mounted on a sturdy base, and properly centered and leveled at right angles to the median and horizontal planes of the target by means of plumb lines and a machinist's level. Size differences were created in the various slides by using size lenses mounted before the lenses of the camera. The lenses used in creating the different amounts of magnification are shown in Table I.

The target was photographed on direct positive films, using a lens opening of f22 and a shutter speed of 1/10 second, with a distance setting of 4 feet. Lighting was provided by four #2R photofloods placed to provide sufficient shadowless illumination in relation to the exposure time and lens opening used. The film was developed using the standard procedure for direct positive film as specified by the Eastman Kodak Co.[12] The developed film was cut and mounted in aluminum and glass stereo mounts, using a standard stereo mounting procedure.[13]

From the preceding processes were obtained twenty-one slides which were to measure the various amounts and kinds of aniseikonia induced by the different size lenses. In each case the magnification was induced before the right eye. By reversing the position of the slide before the subject's eyes, it is possible to introduce magnification before either the right or left eye as desired.

TABLE I

Size Lenses Mounted Before the Camera for Creating the Induced Size Differences Used in Photographing the Space Eikonometer Target

Magnification Induced	Lenses Used	Magnification Induced	Lenses Used
0% (Normal)	NONE	2.50% x 180	2.50% x 180 R
0.50% x 90	0.50% O.A.R.	3.00% x 180	3.00% x 180 R
1.00% x 90	1.00% O.A.R.	3.50% x 180	3.50% x 180 R
1.50% x 90	1.50% O.A.R.	4.00% x 180	4.00% x 180 R
2.00% x 90	2.00% O.A.R.	0.14° s	0.25% O.A.L.
2.50% x 90	2.50% O.A.R.		0.50% x 45 R
3.00% x 90	3.00% O.A.R.	0.29° s	0.50% O.A.L.
3.50% x 90	3.50% O.A.R.		1.00% x 45 R
4.00% x 90	4.00% O.A.R.	0.57° s	1.00% O.A.L.
0.50% x 180	0.50% x 180 R		2.00% x 45 R
1.00% x 180	1.00% x 180 R		1.50% O.A.L.
1.50% x 180	1.50% x 180 R	0.86° s	3.00% x 45 R
2.00% x 180	2.00% x 180 R		

Overall magnifiers instead of meridianal magnifiers were used in creating size differences in the horizontal meridian so as not to induce tilting of the cross, thereby making judgments easier for the subject (14). "R" and "L" indicates size lens placed before right and left lens of camera.

The stereo viewer used for viewing the slides was a Stereo Realist Viewer, Model ST62-56, with matched, two element 45 mm. lenses, adjustable inter-pupillary distance, focus control, and a rheostat for controlling illumination. Eye level indicators were marked on both sides of the viewer. Scratch marks to indicate inter-pupillary distances of 62 mm., 66 mm., and 70 mm. were also made. The apertures in the viewer were modified so as to abolish peripheral fusion by presenting a circular aperture to one eye and a square to the other. The focus control of the viewer was set so that the vergence of the light emanating from the slides through the lenses was the same as that of the space eikonometer, with which its measurements were to be compared. This was done by viewing the targets of both instruments through a 10X telescope set for infinity, so that each of the targets appeared clear. The viewer was mounted upon an adjustable pedestal placed on an instrument table. Figure 2. Head position was maintained by using an adjustable head and chin rest.

PROCEDURE

The authors acted as subjects for this study. Varying amounts of magnification were induced randomly and alternately before the subject's right and left eye by placing the desired size lens in a trial frame along with the subject's habitual prescription. The amount and kind of magnification induced was disclosed neither to the subject nor the examiner so as to avoid any bias. The size differences created for

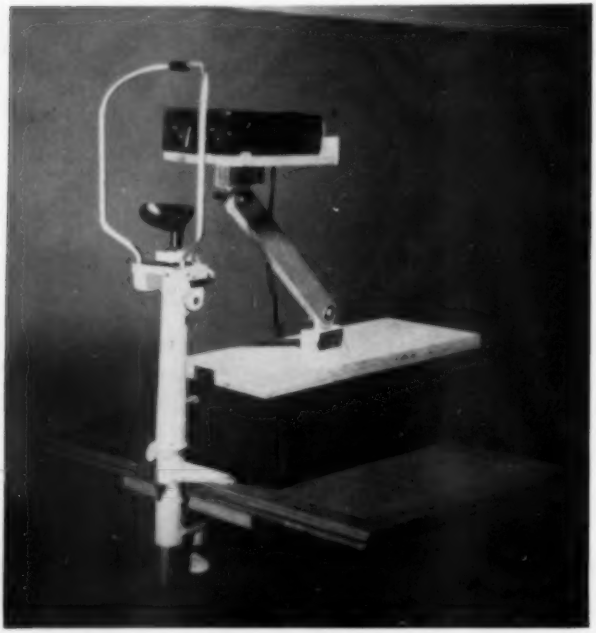

Fig. 2. Stereo viewer mounted on an adjustable pedestal and table, showing head and chin rest in position.

this purpose were divided for comparison into five groups: axis 90, axis 180, declination, and overall magnifications measured in terms of axis 90 and axis 180.

With the trial frame in place the subject was seated before the instrument upon which measurements were to be obtained, and carefully positioned in relation to eye level, head position, and interpupillary distance. The method of limits was used for obtaining aniseikonia measurements on both instruments concerned and a modified ABBA technique was used to minimize practice effects, the subject first being measured on one instrument and then on the other for any given size difference.[15] For the next size lens used, the order of instrumentation was reversed. Sufficient rest was allowed between sittings so as to avoid the effects of fatigue.

Before proceeding with each set of measurements, it was necessary to be assured that stereopsis was present. This was accomplished by eliciting the desired response from the subject while viewing the "normal" target in each instrument. Ten series of readings were taken by

the method of limits for each size difference created in the horizontal meridian, vertical meridian, and oblique meridians (declination), five ascending and five descending in each case. This same procedure was followed using overall magnifications, except that six series of readings were taken for each size difference induced, three ascending and three descending. For each presentation of the eikonometer target or stereo slide, the subject was forced to make a two category judgment as to which of the two front lines was closer in the case of axis 90, which side of the cross was closer in the case of axis 180, and whether the top or bottom of the cross was closer when measuring the amount of declination. Changes in magnification axis 90 and axis 180 were made in 0.50 per cent steps in both instruments. With the space eikonometer, changes in declination were made in steps of 0.2 degree, whereas changes in declination in the screening device were dictated by the slides used.

At the starting point of each ascending and descending series, enough magnification was induced in the instrument or slides, as the case may have been, so that the subject could readily report a tilting of the target. This starting point was varied within the confines of the above stipulation so that the subject would not get set for any particular number of changes before reporting a reversal. Ascending and descending series were presented alternately, starting with plus magnification bfore the right eye in the former, and plus magnification before the left eye in the latter.

The rheostat in the stereo viewer was held constant so as to provide a constant level of illumination at all times. The space eikonometer required no adjustment in this regard, since the illumination level is a fixed one. The lights were turned off between each lens change, however, so as to keep the findings free from any possible residual aniseikonia effects. Room illumination was also maintained at a constant level for all measurements taken.

RESULTS

Data were obtained for each subject showing the means, standard deviations, standard error of the means, standard error of the difference between means, "t" scores and levels of confidence for each per cent magnification induced in the different meridians. The data were presented for both the screening slides and the space eikonometer. A graphical presentation showing a comparison of the means obtained for each type of magnification was also made.

In general, the graphs for all three subjects for axis 90 and axis 180 showed a crossing of the curves at about 1.5% using the abscissa as a point of reference, the eikonometer means being higher for the

higher per cents and lower for the lower per cents. Subject R. M., however, showed no crossing of the curves for axis 90 with consistently higher readings on the space eikonometer. The screening slides showed closer approximation to the expected slope of + 1.0 for the three subjects in both groups. The difference between means obtained on both instruments represent significant differences, although some were found to be not significant.

Declination showed a greater difference between subjects. The graphs for subjects R.M. and H.C. showed no crossing of the curves, with greater differences at the higher degree values. These differences were found to be signficant at the 0.05 level of confidence. The curves for subject M.F. showed a crossing at about 0.3 degrees declination, again using the abscissa as a reference point, with no signficant differences found between the means for all degrees of declination measured.

Overall magnification measured in terms of axis 90 showed data similar to those of axis 90 in that there was a crossing of the graphs, this time at about 2.00% in relation to the abscissa. Subject R.M. showed higher means, on the average, for the screening slides for higher per cents, and lower means for the lower per cents. Overall magnification measured in terms of axis 180 shows no set pattern between subjects, with relatively greater differences between means.

Mean sensitivities for each kind of magnification induced are shown in Table II. Although subject R.M. shows greater sensitivity (less variability) for measurements taken with the space eikonometer at axis 90 and axis 180, the other two subjects show a greater sensitivity with the screening slides, as do all three subjects for the declination measurements. Except for subject H.C., less variability (about 0.06%) was recorded for axis 90 than for axis 180. Both instruments, however, show comparable figures for all groups.

In order to present composite graphs of the means of the three subjects, the means for each per cent magnification induced were combined and averaged for measurements taken on both instruments. The graphs showed the same general tendency for axis 90 and axis 180 as did the individual graphs, crossing this time at about 1.00% magnification in relation to the abscissa. Again the eikonometer showed higher means for the higher per cent and lower means for the lower per cents of magnification. Results for combined declination measurements showed, in general, curves for both instruments conforming more closely to the expected slope of + 1.0 than those found for the individual subjects. The graph showed a crossing of the curves at the intersection of the x and y coordinates, the eikonometer again showing

TABLE II

Mean Sensitivities for Each Kind of Magnification Induced as Measured on Both Instruments for Each Subject and Calculated From the Means of the Individual Sigmas of Each Group.

	Subject	Screening Slides	Eikonometer
	H.C.	0.440%	0.490%
Mean$_\sigma$ X 90	M.F.	0.200%	0.282%
	R.M.	0.310%	0.221%
	H.C.	0.360%	0.460%
Mean$_\sigma$ X 180	M.F.	0.266%	0.375%
	R.M.	0.378%	0.248%
	H.C.	0.150°	0.160°
Mean$_\sigma$ ϛ	M.F.	0.098°	0.100°
	R.M.	0.115°	0.158°

higher means for the higher degrees. Overall magnification measured in terms of axis 90 showed the familiar crossing of the curves at about 2.50% induced magnification. Overall magnification in terms of axis 180 more closely approximated the expected slope of zero, with the curves again crossing at the origin. The screening slides showed a closer approximation to the expected than did the space eikonometer.

DISCUSSION

The graphs for axis 90 and axis 180 showed a crossing of the curves for both instruments, thereby negating the possibility of a constant error between the two. The tendency for the means obtained with the eikonometer to be higher at the higher per cent magnifications and for the means obtained with the screening slides to be higher at the lower per cent magnifications prevails throughout. The difference between means at both extremes of the graphs, as determined by the lines of best fit (using the eye as a criterion), approximates 0.50%, with the crossing occurring between 1.00% and 2.50% magnification. These differences, for the most part, seem to be significant.

It should be noted at this time that neither of the two curves representing the aniseikonia measured with the two instruments involved showed the expected slope of + 1.0. Whereas the eikonometer showed a greater slope for all the axis 90 and axis 180 curves, the screening slides approach more closely to the theoretical expected. In spite of this discrepancy found between the measurements obtained with the use of the space eikonometer and the expected slope, this instrument is used as a criterion for comparison since it is the only eikonometer readily available and widely used at the present time.

By studying the individual and combined data for axis 90 and axis 180, it seemed that there was a tendency for the screening slides to show higher amounts of aniseikonia than would be measured on the

space eikonometer for values between 0.00% and 1.50%. This amounts to a difference of about 0.50% at zero magnification. This difference progressively decreases as it approaches about 1.50% magnification, at which point there is relatively no difference between means obtained with both instruments. Beyond 1.50% magnification, this difference tends to increase to a maximum of about 0.60% at 4.00% magnification, which is a negligible difference considering the amount of aniseikonia involved. If the space eikonometer is to be taken as a true measure of aniseikonia, it would imply that the measurements obtained with the screening slides would have to be altered accordingly for the lower values, since the same differences become more significant at lower levels of magnification.

Sensitivities for axis 90 and axis 180, as shown by the combined sigmas in Table II, indicate comparable figures for both instruments, illustrating, if anything, a slightly greater sensitivity with the screening slides.

In comparing the results obtained for the measurements of declination it was evident that a greater difference existed between means obtained for both instruments than for those shown for axis 90 and axis 180. The data for the space eikonometer more closely approximated the expected results than did the data for the screening slides. A possible explanation for this discrepancy is the fact that the space eikonometer is capable of measuring declination in small amounts over a wider range, whereas the slides, being constructed for use as a screening device, were made to cover a limited range in larger steps. More data would be necessary before any definite conclusions can be drawn concerning the reliability and validity of declination measurements made with the screening slides. However, it must be borne in mind that delta measurements are variable and relatively infrequent in number in comparison to those found in the horizontal and vertical meridians. Sensitivity measurements are comparable for both instruments.

Overall magnifications, measured in terms of axis 90 and axis 180, were also measured as a means of getting further insight into the measuring properties of both instruments. However, the results obtained added very little to what has already been brought out by the analysis of the data for magnification axis 90 and axis 180.

Variations in the result obtained between the two instruments, including the crossing of the curves, may be in part explained by the fact that some diffculties were encountered by the subjects in making judgments. These included various asymetries and distortions of the target resulting from incomplete or difficult fusion and/or prismatic effects induced by the high dioptral power of the viewing lenses.

The difference found between the space eikonometer and the screening slides should not interfere with the use of these slides as a qualitative and quantitative screening method since differences in aniseikonia measusements of 0.50% may very well fall into the category of day to day variability within the patient. Also it should be pointed out that a screening device is not a measuring device, so that measurements falling within 0.50% of the "true" aniseikonia as measured by the space eikonometer are more than adequate for screening purposes. It must be kept in mind that a limited number of readings were taken on three subjects only, and that conclusions based on these findings are open to revision as a result of subsequent studies.

SUMMARY AND CONCLUSIONS

It was pointed out that there exists today the need for an accurate aniseikonia screening device. A set of twenty-one stereo slides was made by photographing a model of the original space eikonometer target with a stereo camera. Differences in magnification were created in 0.50% steps up to 4.00% for axis 90 and axis 180, and in varying degrees of declination up to 0.86°. These slides were used in conjunction with a standard stereo viewer, and a screening procedure and recording technique were proposed. An intensive study was made involving three subjects in whom varying amounts of aniseikonia were induced. Measurements made with the screening device were compared to those obtained with the space eikonometer. Examination of the results show that:

1. For values between 0.00% and 4.00% magnification, axis 90 and axis 180 can be measured with the screening slides to within approximately 0.50% of the measurements obtained with the space eikonometer.

2. For values up to 0.86° declination, the wide range of measurements obtained for the three subjects with both instruments allow no definite conclusions to be drawn at this time, although the trend of measurements for the space eikonometer and the screening device tend to be in the same general direction.

3. Sensitivity measurements are comparable for both instruments.

4. The screening device seems to meet the basic requirements for an aniseikonia screening instrument, although further investigation is desirable using a larger number of subjects.

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REFERENCES

1. Wadsworth, O. F., "On the effect of a cylindrical lens, with vertical axis placed before one eye," Trans. Amer. Ophthal. Soc., 2: 342-344, 1875.
2. Wadsworth, O. F., "On the apparent curvature of field produced by prisms," Trans. Amer. Ophthal Soc., 3: 481-485, 1883.
3. Fisher, Harold M., O. D., "An analysis of Statistical Data of Aniseikonia," Trans. of Amer. Acad. of Optom., 12: 52-54, 1938.
4. Allen, Donald G., "A test for Aniseikonia," Arch. of Ophthal., 17: 320-327, 1937.
5. Elvin, F. T., "Aniseikonia—Simplified Method of Measurement," Amer. J. of Optom. and Arch. Amer. Acad. Optom., 26: 78-82, 1949.
6. Brecker, G. A., M. D., "New Method for Measuring Aniseikonia," Amer. J. of Optom. and Arch. Amer. Acad. Optom., 34: 1016-1021, 1951.
7. Lord Charnwood, F. S. M. C. (Hons.), F. B. O. A., "A new test for aniseikonia, Optician, 124: 598-599, 1952.
8. Barnes, R. H.; and Gold, A. A., "An investigation of a new aniseikonic instrument," Senior Project, Dept. of Optom., Col. U., 1952.
9. Blum, Henry; Fradkin, Albert; Harris, Gordon; and Kaden, Arnold, "To determine whether the hand stereoscope may be used as an aniseikonic screening device," Senior Project, Dept. of Optom., Col. U., 1953.
10. Malin, Harry A., "Testing Aniseikonia with a Simplified Space Eikonometer," Amer. J. of Optom., and Arch. Amer. Acad. Optom., 32: 30-40, 1955.
11. Bannon, Robert E., Clinical Manual on Aniseikonia, American Optical Co., New York, 1954.
12. Eastman Kodak Company, Kodak Reference Handbook, Rochester, N. Y., 1952.
13. Morgan, William D.; and Lester, Henry M., Stereo Realist Manual, Morgan and Lester, New York, 1954.
14. Fisher, Harold M., O. D., "A Modification of Space Eikonometer Technique," Amer. J. of Optom., and Arch. Amer. Acad. Optom., 26: 137-143, 1949.
15. Underwood, Benton J., Experimental Psychology, Appleton-Centruy-Croft, Inc., New York, 1949.

THE HANDS, CIRCULATION AND NERVOUS SYSTEM IN OPTOMETRIC PRACTICE*

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Careful observation should arouse the optometrist's index of suspicion not only of refractive disorders but of those disturbances requiring medical referral which might have otherwise been missed or overlooked.

THE APPENDAGES OF THE SKIN

The hair varies in texture, color and distribution with sex, age, race, heredity and disease. The cilia of the lids and eyebrows may be involved in diseases of the scalp or be damaged by local pathologic changes. Hair distribution and texture are frequently disturbed in endocrine diseases. Diffuse alopecia (baldness) is usually senile or hereditary but occasionally it is part of an interesting syndrome of unknown etiology with depigmentation of eyelashes, uveitis and deafness (Vogt-Koyanagi Syndrome).

The nails are affected in a variety of diseases both dermatologic (e.g., psoriasis, fungus infections) and systemic, (anemia, hypothyroidism, etc.). Since the nail beds are quite vascular and the nail translucent they may readily disclose anemia or cyanosis when compared to the examiner's. The short nails of the habitual nail biter may be worth noting.

Disturbances of sweating occur under many circumstances both physiologic (exercise, emotion) and pathologic (hyperthyroidism, Horner's syndrome, fever, etc.). Prickly heat is a sweat gland retention phenomenon in which the itching and stinging may predispose to secondary inflammation. Oil glands may serve as points of entry for pyogenic organisms (e.g., Hordeolum—gland of Zeis). Chronic inflammation of a Meibomian gland (modified sebaceous gland) results in a chalazion.

THE HANDS

The hands often give valuable clues as to the presence of disease.

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In order to yield clinically useful information they must be compared to each other. For example, of all the sundry methods which have been advocated to determine manual dominance, the most obvious and practical is frequently overlooked: the dominant hand is usually slightly larger especially if the patient has done physical labor (which in itself leaves unmistakable imprints upon the texture of the skin in the form of scars, calluses, color and roughness). If no difference in size is readily apparent, the observation of how the patient uses his hands will leave little doubt as to dominance (hence, it should not generally be necessary to ask him—the answer he gives is almost always based on his own observation of the same features you should have noted in the first place).

The hand is a beautifully integrated functional mechanism of the greatest complexity: hence it is not surprising that constitution and disease may alter its appearance. In Marfan's syndrome the hands are long and spider-like (these patients frequently have subluxated lenses); in acromegaly, the hands are spade-like (these patients may have bitemporal visual field defects); a variety of neurologic diseases produce wasting of the small muscles of the hand. Congenital deformities of the hands suggest a search for congenital anomalies elsewhere including the eye and its adnexa.

Evidence of vasomotor disturbances may be found in the form of altered temperature and color. The digital extremities may be enlarged and bulbous (clubbed or hippocratic fingers) and, although sometimes seen as a physiologic congenital anomaly, such changes more often signify chronic anoxia (especially congenital cardiac anomalies and various pulmonary diseases).

"Little hard knobs on the fingers" were described by William Heberden and are often called after him. They generally accompany osteoarthritis although occasionally present in the absence of this condition. Initially they are tender but later become painless. Osler described small painful lumps in the pulp of the finger tips in subacute bacterial endocarditis (not commonly manifesting small retinal hemorrhages and "Roth Spots"). Small "splinter-like" hemorrhages in the nail beds also accompany this dangerous complication of a previously damaged heart. (Endocarditis is a cause of central retinal artery embolism with sudden loss of vision and the characteristic cherry-red macula.)

Tremors and other types of involuntary movements of the hands (especially when extended, fingers spread and eyes closed) accompany various systemic and neurologic diseases (e.g., Grave's disease). Finally

the nicotine stained fingers of the heavy smoker may be worth noting (tobacco amblyopia).

THE PERIPHERAL CIRCULATION

The state of hydration, color and temperature of the skin often reflect the status of the circulatory system in general and the peripheral circulation in particular. Histopathologic investigation tends to confirm the opinion that the retinal vessels provide a fairly reliable barometer of the status of arterioles and venules in more inaccessible parts of the body. Vasomotor disturbances may be produced by both physiologic (e.g., blushing, exercise, menopause) and pathologic conditions.

Pallor and cyanosis are the two most important color changes and are best seen in those areas such as the lips, conjunctiva, fundus, nail beds and ear lobes where there is an abundance of vessels and little overlying tissue. Cyanosis results when the absolute level of reduced hemoglobin in the blood reaches 5 gm. %. It may be due to increased deoxygenation (e.g., venous stasis of heart failure); inadequate oxygenation (e.g., respiratory diseases; right to left cardiac shunts) or disturbances in the blood itself (e.g., polycythemia, methemoglobinemia). Pallor may be localized (vasoconstriction) or generalized. Possible causes for general pallor include indoor living, chronic hemorrhage, deficiency anemias and hemolytic processes. No delay is to be tolerated in referring patients with persistent pallor or cyanosis for medical evaluation.

When blood vessels are damaged they may "leak" constituents which should normally be retained (fluid, albumins, fibrinogen and cellular elements in about that order of severity). Following injury (bacterial, toxic, traumatic, anoxic, nutritional) to the delicate capillary membranes there may follow edema, exudation or hemorrhage. These may be visible in the skin, the conjunctiva, the fundus or in all of these.

The accumulation of certain pigments in the blood, either abnormally or in excess, is responsible for the color changes of jaundice, carotinemia, cyanosis, etc. They must not be confused with changes in pigmentation of the skin itself (suntan, Addison's disease, hemochromatosis, etc.). Some of the ocular signs suggestive of circulatory disease are summarized in Table I.

THE NERVOUS SYSTEM

The nervous system coordinates, integrates and regulates various body functions in order to adapt them to changes in the external and internal environment. In this capacity it is helped by endocrine, blood, cardiovascular and respiratory systems. Neurologic disturbances may result from diseases of the nervous system itelf or may be secondary to systemic disease (e.g., diphtheria, syphilis).

TABLE I

SOME OCULAR IMPLICATIONS OF PERIPHERAL VASCULAR DISEASE

Vision	Blurred vision; diplopia, and photopsiae.
Head	Headache; encephalopathy, and hemiplegia.
External eye	Edema; pigmentation; altered pupil reflexes; pallor; congestion; cyanosis and jaundice.
Fundus	Papilledema; tortuosity; altered A-V ratio; A-V nicking; hemianopsia; scotomata, and amaurosis.
Anterior chamber	Corneal opacities, and pulsating exophthalmos.
Lens	Cataract.
Lids and skin	Petechiae; trophic changes, and ulcers.

Nervous symptoms may be present either as positive or negative features, e.g., the loss of voluntary movement following a cerebrovascular accident (negative) and the appearance of pathologic reflexes such as the Babinski sign (positive) due to release from higher cortical control. The symptoms may represent disturbances of the sensory or motor conducting systems.

Sensory disturbances may be indicated by numbness, anesthesia, paresthesia, hyperesthesia, ataxia and incoordination.

Motor disturbances may be indicated by palsy or paralysis, spasm, contracture, weakness, atrophy, incoordination and abnormal movements.

Disturbances in reflex phenomena may be due to either sensory or motor lesions, e.g., the corneal blink reflex is abolished by a lesion of either the trigeminal or the facial nerve.

Some important ocular manifestations which may accompany neurologic diseases are summarized in Table II.

THE CRANIAL NERVES

One-half of all the cranial nerves are directly associated with the eye or its adnexa and are likely to receive attention during the ocular examination. Since a variety of neurologic lesions may involve these nerves the clinician should not miss the opportunity of availing himself

EDITORIAL FOOTNOTE: The three papers by Dr. David D. Michaels: (1) Observation in Clinical Practice. Am. J. Optom. & Arch. Am. Acad. Optom., 34.2.59-72; (2) Nutrition, Posture, Gait, Face and Skin. Am. J. Optom. & Arch. Am. Acad. Optom., 34.3.128-136, and (3) The Hands, Circulation and Nervous System in the Optometric Practice, were the abridgment of material presented before the American Academy of Optometry, at Houston, Texas, in December, 1956. Because of the limitations of space condensing this material became necessary and in addition a number of his original illustrations have had to be omitted.

TABLE II
OCULAR IMPLICATIONS OF NEUROLOGIC DISORDERS

Symptoms	Disturbed visual fields: photopsia: headache: diplopia: photophobia: ocular pain: paresthesia: epiphoria: vertigo: blurred vision: blindness.
Signs	Disturbed lid motion or reflexes: disturbed pupillary reflexes: exophthalmos: nystagmus: disturbed ocular motility: ocular neuritis: ocular pallor: papilledema: accommodation or convergence weakness: anesthesia: hyperesthesia: anisocoria: unequal lid apertures: Kayser-Fleischer ring: cherry red macula.

of the simple rapid and accurate tests of their integrity. The details are summarized in Figure 1.

MUSCLES, BONES AND JOINTS

Muscles are rarely subject to inflammatory disease. In general, muscular disease may be indicated by symptoms of atrophy, limitations of motion, weakness, pain, spasticity and contracture. Primary muscle diseases often have a familial background.

Myasthenia gravis is a disorder due to disturbed neuromuscular conduction characterized by progressive weakness especially on repeated activity. The muscles of the lid and eye are involved in the early stages and ptosis and diplopia are the usual presenting complaints.

The etiology of Adie's tonic pupil is unknown but it is a benign condition usually discovered on comparing the two pupil diameters. It may have a muscular basis. The sluggish reaction of the pupil may be mistaken for no reaction unless appropriate time is allowed for observation. The ciliary muscle participates in the sluggishness and slow accommodation or relaxation of accommodation may result in transient blurring of vision (which may be mistaken for ciliary spasticity). The diminished or absent tendon reflexes confirm the impression of Adie's tonic pupil.

The bones provide not only a framework for the body but serve as protective casings for certain important organs such as the brain, eye, lungs and heart. Bones, like other living tissue, carry on metabolic processes and there has been considerable speculation as to possible similarities to scleral metabolism. Hence, calcium, phosphorus and other minerals are often implicated by various people in the pathogenesis of myopia. The combination of weak bones and thin sclera (in the blue-sclerotics syndrome) is suggestive but no conclusive evidence is available.

Patients with neuro-ocular symptoms deserve a searching glance at their skulls (fracture, hydrocephalus, bosses, open fontanelles, craniostenosis). In some cases of brain tumor there is a bony prominence over

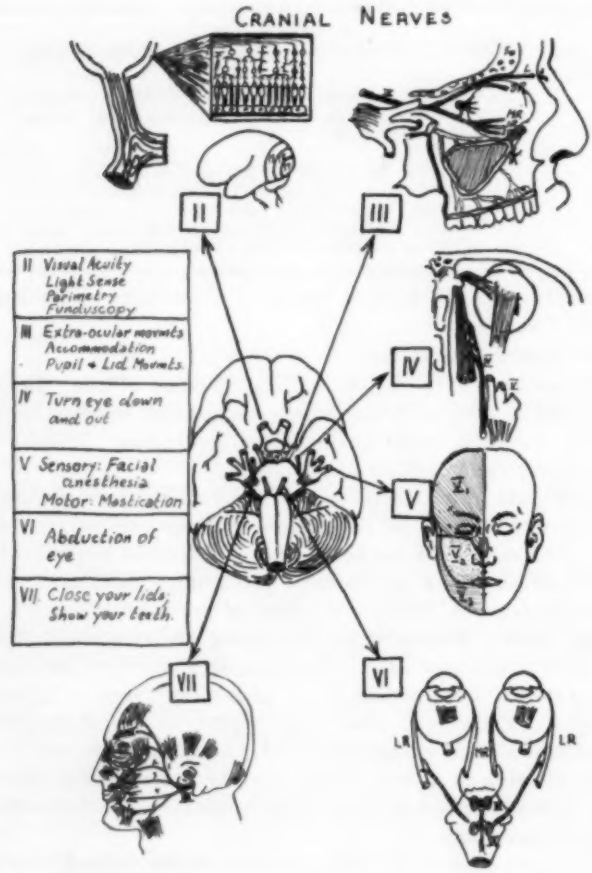

Fig. 1.

the area. Occasionally the patient with brain tumor headache can point quite accurately to the site of the mass.

The muscles move and the joints allow for movement of various body parts. Inflammation of a joint is termed arthritis and it is the second most common cause of disability in this country. Certain forms of arthritis may be accompanied by ocular manifestations (Table III):

MISCELLANEOUS OBSERVATIONS OF HEAD AND NECK

The head should be inspected for evidence of congenital malforma-

tions, deformities and scars following injury (which may provide the only clue to an otherwise obscure lesion of the visual pathway). The

TABLE III

SOME OCULAR IMPLICATIONS OF CERTAIN FORMS OF ARTHRITIS

Gonorrhea	Purulent conjunctivitis: Iritis: Iridocyclitis.
Reiter's Syndrome	Purulent conjunctivitis but no demonstrable gonococci.
Sjogren's Syndrome	Diminished or absent lacrimal secretion: keratoconjunctivitis sicca.
Still's Disease	Iridocyclitis.
Rheumatoid Arthritis	Scleromalacia: keratoconjunctivitis.
Gout	Conjunctivitis: iridocyclitis: keratitis.

cauliflower ears of the prizefighter, the mongoloid facies of certain forms of mental defectives, the characteristics of the cretin and of craniostenosis, the saddle nose of the congenital syphilitic are some dramatic, if rare examples. Each of these incidentally may be present with ocular anomalies.

Deafness is not always obvious. The possibiilty should be kept in mind especially in children who may appear retarded for their age and have been referred in the belief that their vision is defective. It may be partial or complete, congenital or acquired, unilateral or bilateral, central or peripheral. Certain specialized tests (Rinne, Weber and audiometer) are available to those qualified to evaluate hearing loss. For purposes of observation, the patient's ability to repeat conversational and whispered numbers spoken at a distance of some 20 feet will suffice. The ear not being tested is "masked" by rubbing some tissue paper against it. Results are usually recorded on the same basis as the Snellen fraction but in reverse order.

Ringing of the ears (tinnitus) occurs in a variety of conditions and is most distracting to the patient. Patients having nystagmus and vertigo should be asked about its presence (Meniere's syndrome).

Suppurative middle ear infection may spread to involve the Gasserian ganglion and sixth cranial nerve (Gradenigo's syndrome). The latter usually occurs rather late in the course of the disease and the connection may be missed unless this entity is kept in mind.

The most frequent involvement of the nose occurs during the common cold. The mucosa is swollen, red and discharges a profuse watery material which later becomes purulent. I mention this condition for

two reasons: (1) during the acute episode lacrimation and photophobia are not uncommon, and (2) secondary bacterial invasion and extension may involve the sinuses, pharynx, ear and eye. Loss of the sense of smell usually goes along with acute rhinitis: more important if it accompanies optic atrophy and papilledema in alternate eyes for this strongly suggests a frontal lobe tumor (Foster-Kennedy syndrome).

The breath may provide some valuable clues (alcoholic, fetid, acetone, urinous and foul). This may be the first clue to alcohol amblyopia, diabetic or nephritic retinopathy, hence the opportunity of smelling the patient's breath should not be missed (e.g., during ophthalmoscopy). Abnormal respiratory rhythm occurs only in severe disease states but the sighing respiration of the neurotic and the rapid rate of the nervous or frightened individual will be encountered in every office practice.

Alteration in the voice (dysphonia) may vary from slight hoarseness to complete aphonia. It is a very important clinical finding, especially if of recent onset and persisting more than two weeks. No delay in obtaining medical consultation is to be tolerated.

The lips are blue in cyanosis, dry and cracked in dehydration, edematous after injury or subject to "fever blisters." The lips are a not infrequent site of carcinoma (in fact, all persisting swellings or ulcers of this region are suspect until proven otherwise).

In a sense it is fortunate that most serious disorders of the gums or teeth produce pain for it stimulates the patient to seek dental care. Occasionally the pain radiates and may be mistaken for pain arising in the eye or orbit.

The question of "focal infection," especially those arising in the teeth, tonsils and sinuses, is frequently raised in connection with a variety of ocular disorders, as indeed it used to be in the past with reference to systemic diseases. It would now appear that the concept has outlived its usefulness for, as an etiologic agent, it stands in inverse ratio to our understanding of the disorder. The more we learn about pathology the less the evidence that focal infection (with its accompanying "toxemia") plays any significant causative role. Unfortunately it still persists in the thinking of some older practitioners who are wont to attach great importance, for example, to the visual color fields characteristic of such focal infections and even of certain types of focal infection.

Increased salivation (ptyalism) may be due to local inflammation or irritation from the teeth, drugs and poisons as well as other causes. In facial paralysis there may be dribbling of saliva just as there is epiphora and for the same reason. Aptyalism is a feature of Sjogren's

syndrome (see above) and may also follow the administration of atropine or its derivatives.

The regional lymph nodes of the facial region may be enlarged in a variety of infectious diseases including those of the eye. The lymphatic drainage of the eye should be common knowledge, but since it is not it is illustrated in Figure 2. With this in mind, do not fail to palpate these nodes in ocular inflammation, even the apparently mildest type of conjunctivitis.

THE LYMPHATIC DRAINAGE OF EYE

Fig. 2.

A midline swelling in the neck is probably a goiter. It may or may not be toxic. Conversely, thyrotoxicosis may occur without a visible swelling. Since carcinoma of the thyroid is not uncommon *all* neck swellings dictate medical consultation. Thus some large lymph nodes may mean not much more than infected tonsils or teeth but, on the other hand, may also herald the onset of Hodgkin's disease or other lymphoma.

SUMMARY AND CONCLUSIONS

Observation of the patient begins when he walks into the office and terminates only when he leaves. It is therefore continuous and preferably casual. Certain findings may be of little or no significance in one individual but play an important role in the well-being of others.

Thus observation (like the symptom inventory) must be tempered by consideration of the patient as an individual.

The optometrist, as well as the dentist, is frequently afforded the opportunity of observing before the patient seeks medical aid manifestations of disease of which he may be totally unaware. Such disorders may have ocular and visual manifestations which may be the first clue as to their presence. This is especially true because people tend to be apprehensive about their eyes and may neglect other important symptoms. Indeed a considerable proportion of intra-ocular pathology seen by the optometrist in his daily practice is secondary to some systemic disease (e.g., hypertension, nephritis, diabetes, etc.). Occasionally, he may discover evidence of disease by noting a scleral jaundice or visual field change of which the patient was unaware: or, by observing his facial appearance, his posture and gait, skin eruptions and hair distribution, etc., be the first to refer the patient for thorough diagnostic study.

REFERENCES

APPENDAGES OF THE SKIN

1. Wagener, H. P., "Enophthalmos in Horner's Syndrome." Am. J. Ophth. 22: 1083, 1939.
2. Kuntz, A., "Autonomic Nervous System." Philadelphia, 1947.
3. Tassman, I. S., "Eye Manifestations of Internal Diseases." St. Louis, 1946.
4. Gifford, S. R., "Diseases of the Eye and Adnexia Due to Fungi and the Higher Bacteria." Arch. Ophth., 57: 224, 1928.
5. Agg, Z. "Das Vogt-Koyanagische Syndrom." Ophthalmologica, 125: 43, 1953.

THE HANDS

1. Steindler, A., "Postgraduate Lectures on Orthopedic Diagnosis." Vol. I. Springfield, 1950.
2. de Lorimier, A., "The Arthropathies." Chicago, 1949.
3. Cutler, C. W., Jr., "The Hand. Its Disabilities and Diseases." Philadelphia, 1942.
4. Bunnell, S., "Surgery of the Hand." Philadelphia, 1944.
5. Shands, A. R., "Handbook of Orthopedic Surgery." St. Louis, 1948.

PERIPHERAL CIRCULATION

1. Pickering, G., "High Blood Pressure." New York, 1955.
2. Saks, C. I., "Axial myopia and its relation to hypertension." Am. J. Optom., 18: 17, 1941.
3. Lyle, D. J., "Association between retinopathies and encephalopathies in common cardiovascular-renal affections." Am. J. Ophth., 27: 1232, 1944.
4. Paton, L.; and Holmes, G., "The pathology of papilledema." Brain, 33: 389, 1911.
5. Tassman, E. S., "Ocular changes in blood dysorasias." Arch. Ophth. 37: 42, 1947.
6. Gibson, G. G., "Clincial significance of retinal changes in leukemia." Arch. Ophth., 20: 364, 1938.
7. Friedenwald, H., "Pathologic changes in the retinal blood vessels in arteriosclerosis and hypertension." Trans. Ophth. Soc. U. K., 50: 452, 1930.
8. Grifford, R. S., "Evaluation of ocular angiospasm." Arch. Ophth., 31: 453, 1944.
9. Ballantyne, A. J., "The evolution of retinal vascular disease." Trans. Ophth. Soc. U. K., 57: 301, 1937.

10. Kearns, T. P., "Changes in ocular fundus in blood diseases," Med. Clin. N. Amer. (July), 1209, 1956.
11. Tanner, O. R., "Ocular manifestations of infectious mononucleosis," A. M. A. Arch. Ophth., 51: 229, 1954.
12. Moore, R. F., "The retinitis of arteriosclerosis and its relation to cerebral vascular disease," Quart. J. Med., 10: 273, 1917.
13. Ashton, N., "Arteriolar involvement in diabetic retinopathy," Brit. J. Ophth., 37: 361, 1953.
14. Keith, N. M.; Wagener, H. P.; and Barker, N. W., "Some different types of essential hypertension: their course and prognosis," Am. J. Med. Sci., 197: 278, 1939.
15. Friedenwald, J. S., "Retinal and choroidal arteriosclerosis," in Modern Trends in Ophthalmology (ed: Ridley and Sorsby), London, 1940.

THE NERVOUS SYSTEM

1. Brain, R., "Diseases of the Nervous System.", London, 1955.
2. Kestenbaum, A., "Clinical Methods of Neuro-ophthalmologic Examination," New York, 1946.
3. Sommer, I.; and Spiegel, E. A., "Neurology of Eye, Ear, Nose and Throat," New York, 1944.
4. Walsh, F. B., "Clinical Neuro-ophthalmology," Baltimore, 1947.
5. Rea, R. L., "Neuro-Ophthalmology," St. Louis, 1941.
6. Cushing, H., "Distortion of the visual fields in cases of brain tumor," Brain, 44: 341, 1921.
7. Traquair, H. M., "An Introduction to Clinical Perimetry," London, 1938.
8. Ranson, S. W., "Anatomy of the Nervous System," Philadelphia, 1947.
9. Krieg, W. J., "Functional Neuroanatomy," Philadelphia, 1947.
10. Tatlow, W. F., et al., "A Synopsis of Neurology," Baltimore, 1952.

MUSCLES, BONES AND JOINTS

1. Franseschetti, A., "The rheumatic affections of the eye," Ophthalmol., 111: 242, 1946.
2. Dessoff, J., "Blue sclerotics, fragile bones and deafness," Arch. Ophth., 12: 60, 1934.
3. Lyle, D. J., "Early ocular manifestations of Laurence-Moon-Biedl syndrome," Am. J. Ophth., 29: 939, 1946.
4. Wheeler, J. M., "Schuller-Christian Disease," Arch Ophth., 11: 214, 1934.
5. Sorsby, A., "Ocular lesions in bone dystrophies," Trans. Ophth Soc. U. K., 55: 499, 1935.
6. Rados, A., "Marfan's syndrome," Arch. Ophth., 27: 477, 1942.
7. Spira, L., "Congenital ectodermal dysplasia," Acta Med. Scand., 127: 570, 1947.
8. Walsh, F. B., "Myasthenia Gravis and its ocular signs. A review," Trans. Am. Ophth. Soc., 41: 556, 1943.
9. Adie, W. J.; and Greenfield, J. G., "Dystrophia Myotonica," Brain, 46: 73, 1923.
10. Ellis, Z. H.; and McKeown, H. S., "Osseous tumors of the orbit," Arch. Ophth., 5: 449, 1931.

MISCELLANEOUS OBSERVATIONS OF HEAD AND NECK

1. Lederer, F. L., "Diseases of the Ear, Nose and Throat," Philadelphia, 1946.
2. Sydenstricker, V. P., et al., "The ocular manifestations of ariboflavinosis: progress note," J. A. M. A., 114: 2437, 1940.
3. Jeghers, H., "Nutrition, the appearance of the tongue as an index of nutritional deficiency," N. Engl. J. Med. 227.
4. Meakins, J. C., "Dyspnea," J. A. M. A., 103: 1442, 1934.
5. MacBryde, C. M., "Signs and Symptoms," Philadelphia, 1947.
6. Young, T. E., "Primary malignant lymphoid tumors of the neck," Surg. Cl. N. Amer., 33: 695, 1953.
7. Norcross, J. W., "Cervical lymph node enlargements," Surg. Cl. N. Amer., 33: 703, 1953.
8. Mechan, E. W., "Diagnosis of swelling in the neck," M. Press, 232.

9. Werner, S. C.: and Spooner, M., "Some clinical aspects of thyroid physiology." Med. Cl. N. Amer., p. 799, May, 1955.
10. Werner, S. C., "The Thyroid." Philadelphia, 1954.
11. Sjogren, H., "Keratoconjunctivitis sicca." in Modern Trends in Ophthalmology (ed. Ridley and Sorsby), London, 1940.
12. Thomson, St. C.: and Negus, V. E., "Eye symptoms in sinusitis." in Diseases of the Nose and Throat (5th ed.), Cassell, 1948.
13. Hughes, E. B. C., "Discussion on the ocular segvelae of head injuries." Trans. Ophth. Soc. U. K., 65: 35, 1946.
14. King, A. B.: and Walsh, F. B., "Ocular signs in head trauma." Am. J. Ophth., 32: 191, 1949.
15. Morgan, O. G., "Some cases of traumatic myopia." Brit. J. Ophth., 24: 403, 1940.

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During the 60th Annual Congress of the American Optometric Association at Los Angeles the Academy will hold a special luncheon, Wednesday noon, June 26, at the Statler Hotel. The Southern California Chapter of the Academy will be in charge of this event, and Dr. R. W. Tubesing, Richmond, Indiana, president, American Academy of Optometry will speak. All Academy members are urged to attend this social luncheon. Tickets will be on sale at the registration desk and at the meeting room. Dr. Harry A. Jankiewicz, member of the faculty, Los Angeles College of Optometry and chairman of the Southern California Chapter of the Academy will preside at the luncheon.

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VISUAL ACUITY

Since the time of Donders, and probably before, visual acuity has been measured clinically by having the subject read or identify various sizes of test letters. Customarily, the visual acuity of each eye is measured while an occluder is placed before the fellow eye. The occluder itself is usually a black disk, although other types have been suggested.

More recently, a different type of test chart has been used for stereoscopic presentation of the target to the subject. The test pattern varies from a dot in some of the earlier instruments to a checkerboard in some of the more recent modifications. In all of these tests administered with such stereoscopes as the telebinocular, the ortho-rater, and the sight-screener, the acuity is measured for an eye with this eye being presented a target having all test marks; the fellow eye, which is not being tested, views a target having peripheral contours similar to the test card but an absence of the test patterns which are centrally fixated. A simplified statement of such a test card would be one in which there were five

boxes viewed by the right eye. In one of these boxes there is a tiny dot, and the task of the observer is to name the box which has the dot. The left eye would also see the five boxes and, theoretically, would fuse these with those seen by the right eye; the dot, however, would not be present.

When discussing this stereoscopic method of stimulus presentation for the visual acuity test, the statement is often made that it is superior to the Snellen test chart because it is a more natural situation. In this test both eyes are open and, presumably, seeing, and this is stated to be the more nearly normal condition. It is said of the usual test chart reading with one eye occluded that the condition is unnatural since the vision is being measured for an eye while the fellow eye is not seeing. The measurement of monocular acuity under presumably binocular conditions is stated as natural and advantageous. It is the purpose of this paper to examine briefly the validity of this frequently made statement.

In the usual Snellen test, the eye being measured for acuity views a test pattern where both the periphery and central area are presented to the eye being tested, while a blank field is presented to the fellow eye. The nature of the periphery has been subjected to some experimentation and to some degree affects the acuity as measured. It is, for example, known that it is easier to identify a letter viewed by itself than to identify one of similar size presented near the middle of a line of test type. This phenomenon seems to be particularly readily observed in testing the acuity of an amblyopic eye. How great these effects are is not within the scope of the present paper. It is sufficient here to point out that the nature of the peripheral field has some effect upon the target being centrally viewed and identified.

The nature of the occluder has also been studied. At the Stanford University Vision Laboratory, extensive studies were carried on by Horowitz to determine the effect of the occluder upon the measured visual acuity of the fellow eye. It was found that measured acuity was best when the illumination of the occluded eye corresponded to that of the eye whose acuity was being tested. Thus, acuity of an eye would be slightly higher if the fellow eye had a piece of translucent material before it than if it had a black occluder.

In the stereoscopic method of presentation, the peripheral target is the same for both eyes. The target seen centrally is present for the eye being tested only. The fellow eye sees a white or blank area corresponding to the area occupied by the test pattern. It may be noted in passing that the nature of the stimulus being presented as an isolated test pattern and the illumination before the occluded eye being equal

to that before the eye being tested will both tend to give a higher measured acuity. However, we question whether the situation is any more natural than that of the customary occluder.

In stereoscopic testing, the central area of the eye being tested is stimulated by the test pattern while the corresponding area of the fellow eye is stimulated by a white space. These two stimuli, being dissimilar, cannot be fused. On the other hand, the stimuli presented peripherally are similar and can be fused. The task, then, which is set for the observer is to fuse two objects peripherally and to simultaneously identify a test pattern centrally with one eye. What must he do with the central area of the other eye? If the answer is not suppress, it must be, at least, ignore. That the task is one of which the human visual mechanism is capable is readily attested by the large number of patients tested in this manner. But, is it a natural situation? At no time in his natural life can the individual possibly be called upon to view objects in this manner.*

Clearly, factors other than acuity enter into such a test situation. An individual, for example, who found it difficult to fuse peripherally while ignoring the central clear space before the eye not under test would do poorly on the test. Thus, one skill, acuity, is being pitted against another, namely, central suppression or the ignoring of the white central field.

When a target is viewed in the customary fashion, the eye under test has both peripheral and central detail while the fellow eye views a black or white field. Here, too, we are measuring the acuity as well as the ability to ignore the detailless field. However, this is a more natural situation and one encountered every time the individual closes one eye. It is our contention, then, that the concept that stereoscopic testing of visual acuity is a method of testing acuity under natural conditions is untrue. If anything, the situation in which an eye is occluded is more natural.

Stereoscopic testing of acuity may have advantages over the customary Snellen chart. The present paper is not offered as a consideration of these but rather as a refutation of the claim that one such advantage is that the acuity is being tested under natural conditions. A second,

*It should be pointed out that a border in one eye normally induces suppression in a corresponding area in the other eye. In the present situation, the dot would therefore suppress the white area in a corresponding position in the other eye in persons with normal binocular vision. Thus, it might be argued that this is a normal situation. It should be clear, however, that while the mechanism of suppression induced by a border is present in persons with normal vision, the stimulus pattern is not one normally encountered. Thus, what we really have is an abnormal stimulus pattern to which the individual reacts by calling upon a normally present phenomenon.

and more important, purpose is to again reemphasize the complexity of the acuity measurement. It is not a simple measurement, and other factors and skills are involved whatever the method of stimulus presentation. The clinical value and usefulness of the measure, whatever the method of stimulus presentation, rests not upon simplicity or naturalness, but upon such statistics as reliability and upon the fact that accumulated clinical experience over the years has established the measure as a standard.

MONROE J. HIRSCH.

SPECIAL REPORT

INTERPROFESSIONAL RELATIONS IN THE DESIGN OF EYEWEAR*

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PREFACE

This paper and the one which preceded it[1], have been written to express my own personal opinions on how optometry, ophthalmology and opticianry ought to be interrelated in the field of eye care.

DISPENSING OF EYEWEAR BY OPHTHALMOLOGISTS

The recent change of policy on the part of the American Medical Association[2] now makes it permissible and ethical for ophthalmologists to dispense eyewear which they have prescribed. This move has broadened the scope of the ophthalmologist so that he may perform not only the functions which are reserved for the ophthalmologist alone, but he may also practice all of the arts which characterize both the optometrist and the dispensing optician.

This move on the part of the A.M.A. makes it necessary for optometrists to re-evaluate their role in the field of eye care.

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†Optometrist, Ph.D., Director of school. Fellow, American Academy of Optometry.

[1]Glenn A. Fry. The Division of Labor Between Optometry and Ophthalmology. Am. J. Optom. & Arch. Am. Acad. Optom., 34.3.150-156, 1957.

[2]Resolution on Repeal of Section 8, Chapter 1, of Principles of Medical Ethics. J. A. M. A., 158.841, 1955.

ORIGIN OF DISPENSING OPTICIANS

Before ophthalmologists began refracting eyes and writing prescriptions for spectacles, there was no division between optometry and opticianry. Opticians at that time both examined eyes and designed and fitted spectacles.

When medical refractionists began writing prescriptions for spectacles a number of opticians were willing to restrict their activity to filling these prescriptions. In this way a group of dispensing opticians split off from the parent body of opticians. The members of this parent body continued to examine eyes and fit spectacles, and came to be known as refracting opticians. A little later the refracting optician changed his name to optometrist.

ANTIPATHY OF OPTOMETRISTS FOR FILLING PRESCRIPTIONS

Although the optometrist is frequently called upon to fill a prescription written by a medical refractionist, he has gradually developed an antipathy for doing it.

At least four things have contributed to this antipathy:

(1) The feeling that the act of filling prescriptions is degrading because it is regarded as the work of a technician, and an act of merchandising.

(2) The conviction that one man should do the whole job.

(3) Fear that filling prescriptions may detract from his reputation as a refractionist.

(4) Troubles arising from spectacles with which the patient is dissatisfied.

STIGMA OF TECHNICIANRY AND MERCHANDISING

The optometrist has always dispensed the eyewear which he prescribed and has regarded this as a highly professional and essential part of his practice. The process of designing and fitting eyewear is not in itself degrading, but in filling a prescription for an ophthalmologist the optometrist is apt to be treated as a technician, whose work is subject to inspection and criticism before the patient. Furthermore, it is apt to be regarded by the ophthalmologist as an act of merchandising.

The recent move to secure permission from organized medicine for ophthalmologists to dispense eyewear will have a profound effect upon the attitude of the optometrists toward filling prescriptions. If it is proper for an ophthalmologist to design and fit eyewear it can no longer be regarded as degrading work when it is referred to someone else.

CONVICTION THAT ONE MAN SHOULD DO THE WHOLE JOB

Many optometrists are thoroughly convinced that one man should do the whole job including refraction and designing and fitting. They are so convinced that this is in the patient's best interest that they take a dim view of one man writing a prescription and another filling it.

LOSS OF PRESTIGE THROUGH FILLING PRESCRIPTIONS

If an optometrist fills a prescription, the word is apt to get around that Mrs. Jones goes to Dr. Smith to have her prescriptions filled but goes to Dr. Brown to have her eyes examined. This carries with it the subtle implication that Dr. Smith cannot properly examine eyes and hence Dr. Smith prefers to have his name associated only with doing a complete job.

DISSATISFIED PATIENTS

The headaches for the optometrist that arise when the spectacles cannot be worn satisfactorily, have also contributed to the optometrist's antipathy for filling prescriptions. If an ophhalmologist's prescription has been used in designing a pair of spectacles and if the optometrist knows that the spectacles have been properly designed and fitted and if the patient is unhappy, he is confronted with the obligation to refer the patient back to the ophthalmologist for a new prescription.

STEERING OF PATIENTS BY DISPENSING OPTICIANS

The dispensing optician does everything in his power to steer patients to ophthalmologists. This pays off in the long run because ophthalmologists are likely to give prescriptions for spectacles which can be brought back to the optician to be filled.

In my opinion the dispensing optician does not deserve the privilege of advising the public that ophthalmologists only are qualified to examine eyes for spectacles. In this field where the health and welfare of the people are concerned, why should individuals who stand to gain by the increased income that they derive from filling more and more prescriptions, be permitted to tamper with the public's free choice of type of eye care?

Optometrists have imposed upon themselves the restriction that they may not solicit new patients because this would not be professional. Why should they be forced to compete with the ophthalmologist-and-dispensing-optician-team, on such an unfair basis where no restrictions against soliciting exist?

LICENSING DISPENSING OPTICIANS THROUGH OPTOMETRY BOARDS

The ideal solution to the opticianry problem is to license and regulate dispensing opticians through our boards of optometry as is already

done in South Carolina and Rhode Island. By licensing dispensing opticians through the optometry board, we can stop opticians from misrepresenting the work of optometrists.

ARGUMENTS AGAINST ANTI-DISPENSING-OPTICIAN-LEGISLATION

We have a number of optometrists who write prescriptions and have them filled by dispensing opticians just as ophthalmologists. If this practice should become widespread, and it might, we would need dispensing opticians to fill our prescriptions.

In the second place optometry cannot justify any move which would make it necessary for ophthalmologists to fill their own prescriptions. Optometry has officially recognized the role which the ophthalmologist must play in the field of eye care and has also officially recognized the practicality and feasibility of having his prescriptions filled by a dispensing optician.

It may be necessary to impose legislation upon the dispensing optician to curtail his transgressions against optometry, but it ought not to interfere with his right to fill prescriptions.

ULTIMATE DISPLACEMENT OF DISPENSING OPTICIANS BY OPTOMETRISTS

If the optometrist continues to fill his own prescriptions and if he becomes willing to make himself available for filling prescriptions written by ophthalmologists, ultimately the need for dispensing opticians may decrease.

OVERALL PROGRAM OF EYE CARE FOR THE FUTURE

In planning for the future, we need to know approximately how many ophthalmologists are needed to take care of the treatment of eye diseases, and how these numbers should be distributed over the country, and what fraction of an ophthalmologist's time ought to be devoted to routine refractions. Provision must be made for an adequate stream of new ophthalmologists to keep the ranks full to meet the need.

Optometrists ought to make their service as designers and fitters of eyewear available to the patients of ophthalmologists, and they also ought to make the public aware that these services are available.

If an ophthalmologist refers his patients to an optometrist for their spectacles, it is inevitable that many a patient may subsequently come back to the optometrist for his refractive needs and thus the ophthalmologist will lose the patient. This may prove to be a godsend if the ophthalmologist is trying to reduce his load.

On the other hand, if this loss of patients should threaten the income of the ophthalmologist, he could simply resort to filling his own

prescriptions, or sending them to dispensing opticians, or employing an optometrist or dispensing optician in his own office to do the designing and fitting for him.

Under this scheme of things what will happen to the dispensing optician? Some may continue as dispensing opticians who maintain their own offices. Many may find employment as assistants in the offices of optometrists and ophthalmologists. Many, on the other hand, may want to go into the prescription laboratory or join some optical manufacturing concern. Many may take additional training and become optometrists.

REFRACTIONS BY OPHTHALMOLOGISTS

It is the conviction of the author that the amount of refracting performed by ophthalmologists should be kept at a minimum. It costs a great deal to train ophthalmologists to diagnose and treat diseases of the eye, and it is a great waste of this training for an ophthalmologist to spend a great amount of his time performing refractions which can be done by an optometrist who is specifically trained for this type of work, and whose training costs much less.

Every citizen has a right to be concerned in this matter, because public funds are being used to train both ophthalmologists and optometrists.

It is recognized that the ophthalmologist must be an expert refractionist. He must use his refractive findings in diagnosing diseases of the eye and he must understand the refractive and motility characteristics of the eye when he is performing operations which will affect the performance of the eyes as optical instruments.

But it is one thing for an ophthalmologist to do enough refractions to maintain proficiency and quite another to earn the major portion of his income in this way.

The total volume of refractions performed by ophthalmologists can be regulated in several ways by ophthalmologists working as a group or as individuals.

If the total number of refractions which ophthalmologists have to do to earn a living is large in comparison to the work they do in treating diseases of the eye, this means that the number of ophthalmologists in practice is too large; the number of candidates being encouraged to enter the field should be reduced.

The number of refractions that the ophthalmologist is being called upon to do is currently augmented by referrals from general practitioners and by patients who have been solicited by dispensing opticians. The irresponsible solicitation of patients by dispensing

opticians can be stopped by licensing and regulating them through the optometry boards. The general practitioner needs to be educated to help distribute the load of refractions properly between the optometrists and ophthalmologists.

When a given ophthalmologist finds himself too loaded with refractive work, he can start referring his patients to optometrists for spectacles, with the hope that some of these will eventually become patients of optometrists.

If the ophthalmologist is busy enough to keep his appointments booked well in advance so that anyone who needs a refraction only will have to wait for a long period, this factor alone will favor the selection of some optometrist who is more available and who gives refraction primary consideration in scheduling appointments.

OPHTHALMOLOGICAL JUSTIFICATION FOR REFERRING DISPENSING

Most optometrists are firmly convinced that it is better for one man to do the complete job, including refraction and the design and fitting of eyewear than it is to try to divide this work between two men. It is perfectly consistent with this policy, therefore, to argue that the referral of patients from ophthalmologists to optometrists and dispensing opticians should be kept at a minimum. There are two ways to do this. One is to keep the amount of refractive work done by ophthalmologists at a minimum and the other is for the ophthalmologist to do his own dispensing. If refraction is a given ophthalmologist's mainstay in earning a living he can well afford to fill his own prescriptions. If on the other hand he is doing just enough refractions to keep proficient at it, there is no reason at all to insist that he should dispense eyewear and he is thoroughly justified in referring this work to someone else.

OBLIGATION TO ACCEPT REFERRALS FOR FITTING EYEWEAR

It is the opinion of the writer that a person who is licensed to practice optometry and who hangs out his shingle in a community is obligated to members of that community to accept referrals from ophthalmologists for the design and fitting of eyewear, or to see to it that this kind of service is rendered by someone in his community.

There are those who do not recognize this obligation. Some optometrists are so convinced that one man ought to do the whole job that they will not accept work on any other basis. There is also the special case of an optometrist in a small town near a large city who seeks to discourage members of his community from going to the big city to get prescriptions by simply refusing to fill them.

If an optometrist is busy with patients who have been his patients

for years, he is quite justified in not accepting new patients who have been referred to him for the design and fitting of glasses, but he is still obligated to make certain that this service is somehow or other available to the members of his community.

There is also the optometrist who prefers to limit his practice to examining eyes and vision training and consultation on visual problems. This he is privileged to do, but he still shares with the optician and the other optometrists in the community the responsibility of seeing to it that the eyewear needs of the community are properly met.

DESIGNING AND FITTING EYEWEAR A SERVICE TO PATIENT

We must look at the problem from the point of view of the patient. He has every right to consult one professional man and obtain an opinion as to what correction he should be wearing and he can expect to obtain a statement of this opinion in the form of a written prescription. He can then consult a second professional man as to how his spectacles ought to be designed and then he can authorize the second professional man to fabricate a pair of spectacles based on a combination of the two opinions. In this connection the optometrist is not rendering service to or for the ophthalmologist, he is doing it for the patient.

PROPER METHOD OF HANDLING REFERRALS

If we impose upon the optometrist the moral obligation to accept referrals, we ought to do what we can to ease his antipathy for doing this kind of work.

When an ophthalmologist refers a patient to an optometrist for the design and fitting of eyewear it must be a matter of referral of a patient from one professional man to another, and should carry along with it all the courtesies accorded by one professional man to another.

Both the ophthalmologist and the optometrist are authorized to refract eyes and to design and fit eyewear. Men of equal responsibility cannot tell each other what to do, they can only make recommendations. Hence, what is commonly referred to as a prescription should be called a recommended correction.

In referring a patient to an optometrist, the ophthalmologist could explain to the patient that he does not undertake to design and fit spectacles but will have to refer the patient to an optometrist who does. He could then transmit to the optometrist his recommended correction. In addition he might want to send some of the actual findings upon which the recommended correction was based. These would be useful in designing a pair of spectacles.

If the recommended correction is used in fabricating a pair of

spectacles, but does not prove to be satisfactory, the patient would have to be referred back to the ophthalmologist.

When it actually comes time to refer a patient back to the ophthalmologist for a new recommended correction, the patient might request the optometrist to make the second examination himself. If the recommended correction is regarded as a recommendation instead of a prescription, there should be no embarrassment to the patient in making such a request nor to the optometrist in granting it.

The optometrist, having made an examination of his own before redesigning the spectacles, would be obligated in the final check to see not only that the spectacles were properly designed and fitted but would also have to recheck the correction itself.

Regardless of what happens, the patient should continue to be regarded as belonging to the ophthalmologist through all of these transactions and a complete report should be submitted to the ophthalmologist.

If, however, when the time comes for a subsequent examination the patient elects to come directly to the optometrist, he becomes at this point the patient of the optometrist.

When the optometrist refers a patient to an ophthalmologist because he has encountered symptoms of pathology, the patient ought to be regarded as belonging to the optometrist unless the disease is chronic and then the responsibility for the cradle-to-grave program of eye care should be transferred to the ophthalmologist.

When an optometrist refers a patient to an ophthalmologist, the ophthalmologist should feel free to make whatever refractive measurements are essential for the diagnosis, prognosis, and treatment of the eye. In submitting a report to the referring optometrist he could report his refractive findings directly and not compute from them a recommended correction, but if he regards the wearing of a particular correction essential for the treatment of disease of the eyes he should say so and give his recommendation.

In certain cases, for example, one in which a cycloplegic refraction appears desirable, the optometrist might well refer a patient to an ophthalmologist for the specific purpose of obtaining from him a recommended correction.

NEED FOR DISPENSING OPTICIANS TO CHANGE THEIR ATTITUDES

One of the things that contributes to the antipathy of the optometrist toward dispensing is the willingness of the dispensing optician to regard himself as a merchant—a mere seller of spectacles. It is true that ready-made glasses and plano sun glasses are sold as items of merchan-

dise, but there is no more reason for a dispensing optician to regard the filling of a prescription as an act of merchandising than for an optometrist to regard his filling of his own prescription as an act of merchandising.

The design and fitting of eyewear requires a high degree of skill and understanding. To do it properly a designer and fitter must have mastered a certain amount of mathematics, anatomy, physiology, psychology and physical, geometrical and physiological optics. He must understand the theory of designing and fitting of spectacles in addition to acquiring mechanical skill in the art.

Furthermore, the designer and fitter is not discharging his obligation to the patient unless he assumes a professional attitude in which he regards every move he makes a part of a life-long program of eye care for the patient.

IMPROVEMENT OF STATUS OF DISPENSING OPTICIAN THROUGH LICENSING

The designing and fitting of eyewear is a part of the art of optometry, and therefore when a dispensing optician engages in this type of work, he is practicing a limited kind of optometry. In South Carolina, he is licensed to practice opticianry through the State Board of Optometry. The laws in each state should be modified to license the dispensing optician through the optometry board and should impose upon him educational and professional standards which would bring the quality of his dispensing work to the same level as the dispensing work of the optometrist.

LOOKING AT A PRESCRIPTION

It should be emphasized that a prescription only specifies the recommended correction to be incorporated. When the designer completes his design and writes it up as an order to the prescription laboratory, this order includes, in addition to the recommended correction, a long list of specifications based on numerous facial measurements and visual tests. As a matter of fact the recommended correction may be rewritten if for one reason or another the spectacles are designed for a different distance than was assumed in the original recommended correction.

Some of the optical properties of the spectacles do not become defined until the fitting operation is reached.

The filling of a prescription is not, therefore, the work of a technician. There are numerous basic professional judgments which have to be made in both designing and fitting which are not covered by the prescription.

The work of the designer and fitter should not be confused with that of a laboratory technician who fabricates a pair of spectacles according to a design which includes complete specifications. These are written out on the order blank which the designer fills out for the laboratory technician.

INSPECTION NOT NEEDED FOR DESIGNING AND FITTING

It is often suggested that it is all right for an unlicensed dispensing optician to fill a prescription as long as the ophthalmologist checks the spectacles. However, the only thing which the ophthalmologist would have a right to question would be whether the recommended correction had been incorporated. It would be practically impossible to set up a rigid set of standards in terms which the ophthalmologist could say that the designer had made the wrong decision in setting up a given specification for a piece of eyewear.

Surely an optometrist would not relish having his work subjected to this kind of inspection.

The only solution is to make certain that the designer is qualified to do his job and then trust him to do it.

Manuals for designing and fitting eyewear ought to be prepared and approved jointly by optometrists, ophthalmologists and dispensing opticians. These should outline the general principles, and then once a designer and fitter is properly trained he should be trusted to do his work properly.

The only occasion that might arise in which an ophthalmologist should want to check a pair of spectacles would be one in which a patient had been referred back to him because the prescription was believed to be incorrect. In this case he might find it necessary to check his own prescription and the spectacles before finding the source of the trouble. In this case he would be evaluating the spectacles on the same basis that he would evaluate a pair of spectacles worn by a patient at his first visit.

DIGEST

RECENT EYE BOOKS

In 1943 the first edition of *Lectures on Motor Anomalies* by Alfred Beilschowsky, M.D., then of the Dartmouth Eye Institute appeared. Later, second and third editions were printed. These, too, were sold and now a fourth edition has made its appearance. The con-

tents are identical with previous editions, but the new edition is put out in a slightly different format and sells for $2.50 with heavy board covers. 186 pages. Illustrated. 1956.

This book contains 12 basic and fundamental lectures on motor anomalies of the eyes that have become classics in both ophthalmology and optometry throughout the world. The titles are: I. Physiology of Ocular Movements. II. Theory of Heterophoria. III. Signs and Symptoms of Heterophoria. IV. Etiology of Strabismus. V. Development and Course of Strabismus. VI. Principles of Surgical Treatment. VII. Paralyses: General Symptomatology. VIII. Paralysis of Individual Eye Muscles: Abducens-nerve Paralysis. IX. Oculomotor-Nerve Paralysis and Ophthalmoplegias. X. Supranuclear Paralyses. XI. Etiology, Prognosis and Treatment of Ocular Paralyses. XII. Ocular Spasms. Readers wishing a copy of this splendid work should send their check for $2.50 to Dr. Gordon H. Gliddon, Baker Library, Dartmouth College, Hanover, New Hampshire.

Last fall, the Chilton Company, 56th and Chestnut St., Philadelphia, published *The Truth About Eye Exercises* by Phillip Pollock, O.D. 117 pages, cloth. In this book the author analyzes the various systems of eye exercises as taught by Bates and his followers. His sources of reference are scientific and authoritative. His review of the Bates techniques disproves their claims for cures in such cases as myopia, colorblindness, hypermetropia and other disorders. At the same time the author presents a good case for proper orthoptic training in selected cases. This is a fine book and will do much to dispel the confusion that exists in the mind of the public about eye exercises.

The second edition of *Neurology of the Ocular Muscles* by David G. Cogan, M.D., professor of Ophthalmology, Harvard University Medical School, Boston, was published late in 1956. It is somewhat larger than the first edition and consists of a well done correlation of clinical symptoms with the anatomy and physiology of the nervous mechanisms. The author is a neuro-ophthalmologist and he ties together objective signs and related symptoms with the most advanced clinical concepts of neurological services. This text is very well illustrated. It is published by the Charles C. Thomas Company, 301-327 East Lawrence Ave., Springfield, Illinois. 296 pages. Cloth. 1956. $8.50.

To abridge the gap between geometrical and physical optics and the very advanced technical books on optical design H. H. Emsley, B.Sc., former head of Applied Optics Department, Northampton Polytechnic, London, has written a new text book entitled *Aberrations of Thin*

Lenses. This has been published by Constable and Company, 10 Orange St., London, W.C.2, England. 352 pages. Illustrated. Cloth. 1956. 50s. The publishers refer to the author's treatment of the subject as elementary, but it is the sort of a book that by its very nature separates the mathematicians from those that like their arithmetic simple. Actually, this is no simple subject. Thin lens systems are becoming more and more important in instrument design and laboratory work and this book by that great English optometrical teacher, Emsley, will play its part in the technical advances to come.

During April, the New York University Press, Washington Square, New York 3, New York, has released a new book, *Optics, The Science of Vision*. This new volume is written by Vasco Ronchi, Ph.D., Director of the National Institute of Optics, Arcetri, Italy, and translated by Edward Rosen, Ph.D., associate professor of history, City College of New York. 360 pages. Illustrated. Cloth, $10. It is clear that *Optics, The Science of Vision* is a result of the author's dissatisfaction with the classical concepts of optics and physiological optics which he believes are incorrect as he finds that these concepts for the most part operate only under perfect conditions and fail to take into account the limitations of the observer. Ronchi views optics and vision as a sister science to photography and photo-electricity. He claims to have found that most of the laws applicable to cameras and photo-electric cells apply also to the human eye, with the distinction that the eye has behind it a brain which makes the process of vision more complicated. This book was originally published in Italy.

CAREL C. KOCH.

CURRENT COMMENTS

Terry Judith Parkins
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department; such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

A.O.A. CONGRESS AT LOS ANGELES

The 60th Annual Congress of the American Optometric Association will be held June 23-26, 1957, in the Statler Hotel at Los Angeles, California. All members of the association are urged to attend by

Dr. D. LeRoy Leatart, Long Beach, general chairman of the congress committee. The four-day program is as follows:

SUNDAY, JUNE 23, 1957

9:00 A.M. Registration.
9:00 A.M. Commercial exhibits.
11:30 A.M. Beta Sigma Kappa, meeting and luncheon.
2:00 P.M. House of Delegates, first business session.
7:00 P.M. *Social and Health Care Trends, panel meeting.*
Felix A. Koetting, O.D., chairman, A.O.A. Committee on Social and Health Care Trends; Bernhardt N. Thal, president, California Vision Services; Ted Ellsworth, chairman, Los Angeles Health Plan Consultants Committee; Philip Barnett, director, Los Angeles Painting Industries, Health and Welfare Fund; David C. Sharman, assistant administrative director, A.O.A.

MONDAY, JUNE 24, 1957

9:00 A.M. Commercial exhibits.
9:00 A.M. *Dynamic Visual Acuity.* Slade Hulbert, Ph.D., University of California, Los Angeles.
10:00 A.M. *The Use of Color as a Safety Factor.* Gordon Walls, Ph.D., School of Optometry, University of California, Berkeley.
11:00 A.M. *Optometric Economics of Tomorrow.* Don A. Frantz, O.D. chairman, A.O.A Practice Management Committee.
Noon Buses leave for Disneyland. An afternoon and evening of fun.

TUESDAY, JUNE 25, 1957

8:00 A.M. Annual meeting, American Optometric Foundation.
9:30 A.M. Commercial exhibits.
9:30 A.M. *Motorists' Vision and Highway Safety Panel Meeting.*
W. E. Bryan, O.D., chairman, A.O.A. Committee on Motorists' Vision and Highway Safety; W. E. Hervey, O.D., chairman, California Optometric Association, Committee on Motorists' Vision and Highway Safety; W. S. Foulis, assistant to president, Automotive Safety Foundation; William Stout, KNXT, News Commentator and Traffic Safety Expert; James Gregg, O.D., president-elect, California Optometric Association.
12:30 P.M. A.O.A. fellowship luncheon.
1:30 P.M. House of Delegates, second business session.
7:00 P.M. Dinner. *Visual Problems in Schools.*
7:00 P.M. Dinner. *Department of Public Information.*

WEDNESDAY, JUNE 26, 1957

9:00 A.M. House of Delegates, third business session.
12:15 P.M. American Academy of Optometry, luncheon.
1:30 P.M. House of Delegates, fourth business session.
6:15 P.M. Cocktail hour.
7:00 P.M. Banquet.
Installation and entertainment.

The Congress registration fee for A.O.A. members is $25.00. Wives and non-optometric guests will register for $15.00. Registration includes a banquet ticket.

Optometrists and their families who wish to fly to Hawaii after the A.O.A. Congress should write the Victor Bloom Agency, 8722 Santa Monica Blvd., Los Angeles, 46, for the details of an optometric eight-day all-expense tour of the islands. The flight will be on Transoceans "Royal Hawaiian" leaving from Burbank's Air Terminal on

June 27. In Honolulu the group will stay at the Edgewater-Reef hotel.

EXHIBITORS AT THE OPTICAL FAIR

The Optical Fair in the Palmer House, Chicago, June 7-10, 1957, will present the largest group of commercial optical exhibits ever assembled under one roof. These exhibits will cover every phase of the optical industry from the manufacturing, wholesaling, and distributing standpoints. Lenses, frames, supplies of all kinds, instruments and services used by optometrists will be exhibited by the following firms:

Company Name	Booth
American Bifocal Company	45
American Board of Opticianry	9-C
American Optical Company	6-14
Artcraft Optical Co., Inc.	46-47
Bausch & Lomb Optical Co.	1-5
Better Vision Institute	3C-4C
Bishop Co., Inc.	98
Blue Ribbon Optical Corp.	27-C
California Optical Leather Co.	18C
Celanese Corp. of America	23-C
Century Oxford Mfg. Corp.	93
Coburn Mfg. Co.	32-35
Continental Optical Co.	76-78
Davison Chemical Co.	22-C
E. I. duPont de Nemours Co.	16C-17C
Econ-O-Cloth	43
Fairfield Optical Co.	91
Garvin's, Inc.	28
J. Gaspari and Co., Inc.	75
Gold Filled Manufacturers Assn.	29-30
Hallmark Optical Products, Inc.	8-C
Harlequin Corporation	72
J. Hasday & Sons Optical Mfg. Co.	27
Hela Mfg. Corp.	74
Hudson Optical Corp.	94
Imperial Optical Mfg. Co., Inc.	92
Kelley & Hueber, Inc.	15-16
Ketcham & McDougall, Inc.	18-D
Kono Mfg. Co.	81-82
A. LeMay & Co.	36
Liberty Optical Mfg. Co., Inc.	83-84
Limited Editions, Inc.	19-C
Lind-Gal, Inc.	37
Lord Optical Mfg. Corp.	31
Lumar Optical Mfg. Co., Inc.	24
Marine Optical Mfg. Co.	79
Martin-Copeland Co.	80
Massachusetts Leather Prod. Co.	65-66
May Mfg. Corp.	85
Meyer Optical Co.	12-C
Meyers Trim Co.	5-C
Modern Optics, Inc.	38
Monsanto Chemical Co.	1C-2C
New Jersey Optical Co.	87
Nixon Nitration Works	39-40
Optical Products Corp.	96-97
Optical Wholesalers Nat'l Ass.	11-C
Opticase Co., The	22
Pathway Optical Products Co.	90
Plastic Contact Lens Co.	7-C
Precision Cosmet Co., Inc.	86
Professional Suite	13-C
Robinson-Houchin, Inc.	20C-21C
Rochester Optical Mfg. Co.	41-42
Rosanne Optical Case Co.	95
Rowland Products, Inc.	53-54
Sadler Bros., Inc.	14-C
Shelbar Co., The	73
Shoreham Optical Corp.	51
Shuron Optical Co., Inc.	55-61
Styl-Optics, Inc.	71
Styl-Rite Optics, Inc.	67-68
Team Optical Mfg. Corp.	21
Titmus Optical Co., Inc.	48-50
Tri-Zyl Optical Corp.	44
Tru-Vue Optical Corp.	23
Universal Optical Co., Inc.	88-89
Univis Lens Co., The	62-63
Victory Optical Mfg. Co.	17-20
Vision-East Corp.	99-100
Vogue Optical Mfg. Co., Inc.	25-26
Ward Optical Mfg. Corp.	64
Whitney Optical Co., Inc.	6-C
Younger Mfg. Co.	52
Zylite Products Co., Inc.	101-102
Zylo Ware Corp.	69-70

The Optical Fair is sponsored by the Optical Manufacturers Association, Charles Oddy, executive manager. All optometrists are invited. Their families and guests will be welcome. In addition to the exhibits there will be entertainment, educational lectures and a live style show.

There will be no registration fee and optometrists are urged to spend the big four days, June 7-10, at the Optical Fair in Chicago.

SAVAL SCHOLARSHIP AT MASSACHUSETTS COLLEGE

Dr. Joseph F. Montminy, president, board of trustees, Massachusetts College of Optometry, announces the establishment of the Maurice H. Saval Tuition Scholarship of $600 ($300 per year for two years). This scholarship is available annually to a needy and worthy student who meets all the requirements for admission and who gives promise of achievement in the study and success in the practice of optometry. Application for the scholarship (supplied on request) must be made before September 1 of the year in which the applicant desires to begin his studies. For further information write Registrar, Massachusetts College of Optometry, 178 Newbury Street, Boston, Massachusetts.

A MILLION A YEAR

As everyone knows the American Optometric Association consists of a federation of State Optometric Associations. This group is now reaching "big-business" proportions. The total membership of optometrists in all affiliated associations has now passed the 10,000 mark, thus giving the A.O.A. a dues operating income in excess of $300,000 each year, at $30 per member. There is now some talk among officials of boosting the A.O.A. annual dues payment to $40 each year and this would raise the total dues receipts of the A.O.A. to $400,000 or more, if this suggestion is approved. It is also claimed that the State Associations receive an average of $60 per member, in the form of State dues. If this is true, the total take in dues would reach one million a year, split 40 per cent to the A.O.A. and 60 per cent to the individual state organizations. It was not long ago that a campaign to raise a million dollars within optometry failed, and here we are, getting ready to do it each year and seemingly taking it in stride. Tell this to the next pessimist you meet, when he talks about the future of optometry.

ACADEMY BECOMES AN AFFILIATE OF THE A.A.A.S.

For the past 12 years the American Academy of Optometry has been one of the associate organizations of the American Association for the Advancement of Science, Washington, D. C. On December 27, 1956, the board of directors of the A.A.A.S. voted to change the status of associate organizations to that of affiliates, to better enable them to support the A.A.A.S. in its work for science.

Under this new status the American Academy of Optometry is entitled to representation on the A.A.A.S. Council, and Dr. Robert

W. Tubesing, president of the Academy, has appointed Dr. Henry W. Hofstetter, director, Division of Optometry, Indiana University, Bloomington, Indiana, to represent the Academy on the A.A.A.S. Council.

According to Raymond L. Taylor, associate administrative secretary of the A.A.A.S., the committee of the A.A.A.S. in deciding upon this recommendation, recognized that societies which have already been accepted into the A.A.A.S. are diverse kinds and with diverse objectives, but that all have an interest in the advancement of science. Those who founded the Association more than a century ago wisely placed no limitations on the ways in which it could advance science, although at the time no doubt they thought primarily in terms of scientific research.

On March 22, all members of the Academy who were not already individual members of the A.A.A.S. were sponsored for individual A.A.A.S. membership by Academy president Tubesing. It is expected that a large portion of Academy members will avail themselves of this opportunity to individually join the American Association for the Advancement of Science.

INTERNATIONAL OPTICAL CONGRESS, AMSTERDAM, 1957

The International Optical Congress and the International Optical League will hold their biannual meetings in Amsterdam, Holland, June 11-15, 1957. All optometrists from the U.S.A. and Canada are invited to attend. During the meetings, exhibits of instruments, lenses, frames and optical apparatus will be on display. A number of scientific lectures will be presented by speakers of different nationalities and a syllabus of each lecture in English, French, German and Dutch will be given each optometrist who attends.

Applications for registration and for hotel reservations in Amsterdam should be made by air mail to the Preparatory Committee, International Optical Congress, 1957, Honthrststraat 12, Amsterdam Z, Holland, attention Mrs. R. van Heemskerck, secretary. An outline of the program follows:

Tuesday, 11th June: 11:00 a.m. reunion in the hall of Hotel "Krasnapolsky," drinks, lunch—3:00 p.m. official inaugural ceremony in the auditorium of the Municipal University or in the auditorium of the Royal Tropical Institute—official speeches. Then circular trip by boat through Amsterdam, its canals and ports. Dinner, 8:30 p.m.: official reception by the State and the Town in the halls of National Museum.

Wednesday, 12th June: 9:00 until 12:30 p.m.: lectures in the Royal Tropical Institute: 1:00 - 2:15 p.m., free lunch—2:30, departure for trip by omnibus to Gouda, Rotterdam (official reception), Delft, to The Hague (sight-seeing) and Scheveningen, sea-shore. Walk along the sea-front, joint dinner in the "Kurhaus"

(mannequins, spectacle-show during the dinner in the restaurant). 11:00 p.m., journey back to Amsterdam.

Thursday, 13th June: 9:00 until 12:30 p.m.: lectures in the Royal Tropical Institute; 1:00 - 2:00 p.m., lunch. 2:30 p.m., departure for trip by omnibus: (A) to the reclamations, dike and polder works of the former Zuyder Zee, or (B) through the beautiful landscape of the "Gooi-reserve"—Hilversum (radio-town), the "pleasure-garden" and woods of the "Sticht" (Utrecht), through the beautiful scenery of the "Veluwe" to the government recreation-resort "The High Veluwe" with the castle "St. Hubertus" and the Kröller-Müller-Museum (Van Gogh Gallery). Here trip (A) and (B) join and then drive on to Arnhem (liberation-battle in 1944—Air-borne memorial)—Joint evening-meal in Arnhem, voyage back to Amsterdam.

Friday, 14th June: 9:00 until 12:30 p.m.: lectures in the Royal Tropical Institute; 12:30 - 1:00 p.m.: official closing-ceremony of the Congress, lunch, free afternoon, visits to the optical exhibition. 7:00 - 7:30 p.m.: entry for the official banquet in the halls of the Carlton Hotel, attractions, ball.

Saturday, 15th June: 10:30 a.m. General assembly of the International Optical League in the meeting-room of the Royal Tropical Institute. 1:00 - 2:00 p.m., joint lunch in the basement-restaurant of this Institute. 2:00 - 5:00 p.m., continuation of the General Assembly of the I.O.L. with a 5:00 p.m. closing dinner, evening free. For the Saturday-evening incidental arrangements may be made for visits to restaurants, theater or cabaret. An interesting trip is the evening trip by boat through the illuminated canals of Amsterdam!

Sunday, 16th June: In the morning divine service in the English Church in the "Beguinage" (old and typical community in the oldest part of centre of Amsterdam). At 2:30 p.m., Committee meeting of the International Optical League.

During the Congress, June 12-15, an international exhibition will take place for products of the spectacle-optics and optical and physical apparatus and instruments, and also for technical machines and tools for opticians. This exhibition will be held in the Royal halls, etc., of the Royal Society "Natura Artis Magistra," a five minutes' walk from the Congress-centre. On Thursday and Friday morning the ladies may make trips to the green-houses and the international flower-auction of Aalsmeer and to the typical cheese market of Alkmaar; motor-bus trips have been arranged.

ROSENBLOOM APPOINTED DEAN OF ILLINOIS COLLEGE

In accordance with the action and approval of the board of trustees at the spring meeting held on February 17th, Dr. Eugene W. Strawn, president, Illinois College of Optometry, has announced the appointment of Dr. Alfred A. Rosenbloom, Jr., as dean of the College.

Dr. Rosenbloom was appointed acting dean following the resignation of Dr. Richard Feinberg, who previously held this position.

Dr. Rosenbloom received his Bachelor of Arts degree from Pennsylvania State University in 1942. He was graduated from Northern Illinois College of Optometry in May of 1948 and has served on the faculty since then. In June, 1953, he received his Master of Arts degree with a major in reading at the University of Chicago and is currently working on his Ph.D. in the University's Department of Education.

NEW A.O.A. PRACTICE BOOKLET

Serve and Succeed in the Practice of Optometry, a completely revised version of an earlier booklet copyrighted by the American Optometric Association in 1945, is now available for 50 cents per copy

from A.O.A. headquarters in St. Louis, Dr. Don A. Frantz, chairman of the practice management committee, announces.

The new 32-page booklet was produced to help the new licentiate in establishing a successful, professional practice. It tells the new practitioner how to select a location, how to get started from "scratch," how to become known in the community, how to establish inter-professional relationships and how professional fees are established. It explains the methods of engaging in industrial optometry, it points up some of the most important legal aspects of practice, and it warns against the many pitfalls which confront the new optometrist starting in practice.

TODAY BY LAUSCH & LOMB

The importance of good vision in highway safety is emphasized in Volume 1, Number 1, of a new Bausch & Lomb magazine, TODAY, directed to the nation's ophthalmic professions. The pocket-sized, 32-page publication is attractively illustrated with full-color drawings, sketches, diagrams and photographs. Lead article is an editorial, "Rx for Highway Safety," by George H. Phreaner, manager of B. & L. ophthalmic sales. It calls attention to the new book, *I Drive the Turnpikes and Survive*, by Paul W. Kearney and emphasizes the role being played in several states by the new B. & L. driver testing ortho-rater. The ortho-rater itself and the state driver testing programs, where they are being used are the subjects of a six-page article.

NEWS BRIEFS

According to Dr. Earl J. Hunt, chairman, trophy committee, Phi Theta Epsilon fraternity, the 1957 award in the form of a memorial trophy was presented to Dr. Glenn A. Fry, director, School of Optometry, the Ohio State University, Columbus. . . . Victor D. Kniss has joined the American Optical Company as vice-president and general manager of the ophthalmic division. Mr. Kniss came to Southbridge from the presidency of Westinghouse Electric Supply Company of New York. . . . The 10th annual forum on Visual Problems in Schools, held March 1-3 at Cleveland was a big success. More than 200 optometrists and 1,500 school teachers were registered. . . . The International Film Bureau, Inc., 57 E. Jackson Blvd., Chicago, has a 16 mm. silent film dealing with Experimental Psychology of Vision in its rental collection of educational films. This film was produced in the Psychology Laboratory, Columbia University, and illustrates the chief phenomena and techniques of research in visual perception for classes in elementary or experimental psychology. The film deals with the phi phenomenon, optical illusions, color constancy, eye movements, reading and perception

span. The rental charge for this film, Number 1 P 4 Si, is $2.50. . . . Mr. R. J. Fletcher, faculty member at the Northampton Polytechnic, London, will be the chief speaker at the May meeting of the Canadian Optometric Association, Niagara Falls, Ontario, Canada.

Dr. Newton K. Wesley, vice-president, the Plastic Contact Lens Company, Chicago, will speak before the Japan Ophthalmological Society, May 17-19 at Gifu City, Japan. His talk will deal with new developments in the field of contact lens practice. . . . The Golf Optical Company and the Southwestern Optical Company, both of Houston, have each contributed $150 to the Foundation for Education and Research in Vision Scholarship Fund. The awards from this fund will be announced in July. . . . Reuel A. Sherman, for the past 18 years director of industrial vision at the Bausch & Lomb Optical Company, Rochester, has resigned his position to become a member of the staff of the Titmus Optical Company, Petersburg, Virginia. At Titmus, he will be closely associated with Dr. Richard Feinberg, assistant to the president, in developing testing and training devices to be used in private practice, industry, schools and motor vehicle driver examinations. . . . Miss Elsie Lunborg, librarian of Pacific University, has received a grant of $250 from the United States Steel Corporation to be used to start an index of optometrical literature. . . . Professor Neal J. Bailey, Division of Optometry, Indiana University, has been awarded a faculty summer fellowship by the Graduate School to do research on the subject, "The Effect of Perceived Target Distance on the Clinically Measured Accommodative Convergence Ratio." This award is one of the two faculty awards granted in the field of science on this campus for the summer of 1957.

The speakers at the March meeting of the New York Academy of Optometry were, Dr. Daniel Woolf who spoke on "Instrument Orthoptics," Dr. Nathan Flax who spoke on "Space Orthoptics," and Dr. Harold Solan who spoke on "Controlled Reading." The meeting was held March 19 at the Midston House. . . . Dr. Rupert E. Flower, president of the American Optometric Association, appeared as a guest on the morning Dave Garroway TV show in New York City on March 1. . . . A new Speech Outline Kit has been issued by the A.O.A. Speakers Bureau, Dr. Marilyn L. Brenne, chairman. This very complete kit was designed to supply optometric speakers with speech outlines, examples, statistics on vision and anecdotes so that material would be available in one package to enable the average speaker to easily prepare to appear before any lay audience. The subjects covered are children's vision, occupational vision, industrial vision, motorists' vision and ma-

terial on general eye care. This is a very well done package and should prove most useful. Copies of this material may be secured through the American Optometric Association, 4030 Chouteau Ave., St. Louis 10, Missouri.

TURNPIKE DRIVING

The new Ballantine book, 128 pages, illustrated, *I Drive the Turnpikes and Survive* by Paul W. Kearney contains several chapters dealing with vision and highway safety. It is evident from reading these, that turnpike driving is just one step removed from automobile racing, as speeds from 70 to 90 miles per hour are customary on these new modern highways. The Bausch & Lomb Optical Company, Rochester, has assisted in the promotion of this book, and Mr. Carl L. Hallauer, president of B. & L. urges optometrists to use the 35¢ paper bound edition in their public relations activities as he feels that the Kearney book is "a most significant contribution to vision and safe motor car driving and should have wide distribution." The book is published by Ballantine Books, 101 Fifth Avenue, New York City. With paper covers 35c, cloth bound $3.00, 1956.

NATHANIEL SINGER & ASSOCIATES

Just 50 years ago, in 1907, Morris Singer, a New York City optician founded the *Soft-Lite Lens Company*. At first the ophthalmic glass used in making these lenses was imported, but in 1923 the Bausch & Lomb Optical Company, Rochester, started to manufacture this special formula glass and has made Soft-Lite lenses since that time. Nathaniel Singer, son of Morris, entered the company in 1922 and has managed it in recent years. More than 18 million pairs of these absorptive lenses have been prescribed. In 1953 the distribution of these lenses was taken over by B. & L. and this year the final liquidation of the Soft-Lite company has taken place. According to Nat Singer the stockholders in this corporation have had most satisfactory dividends in the past and the final settlement paid off the former owners at the rate of five to one on their original investments. Nat Singer will now head Nathaniel Singer and Associates, a business consulting firm in the ophthalmic optics field.

PENNSYLVANIA OPTOMETRIC ASSOCIATION ANNUAL MEETING

The 61st annual Pennsylvania Optometric Association convention is to be held at the Bedford Springs Hotel, Bedford, Pennsylvania, on May 19, 20, 21.

Sponsored by the Pennsylvania Optometric Association with the Pittsburgh Optometric Society as host, the convention will be high-

lighted by a balanced program of speakers and entertainment.

Chief lecturer will be Dr. Raymond Roy, Portland, Oregon, who will lecture on "Ophthalmic Migraine and Current Prism Therapy."

Sharing the speakers platform will be Dr. Henry W. Hofstetter, director, Division of Optometry, Indiana University, Bloomington, Indiana, who will talk on "What Is My Practice Worth," an economical appraisal of optometric practices.

Mr. Dave Sharman from the American Optometric Association, St. Louis office, will address one of the business sessions.

Dr. Milton Eger, convention chairman, announces a unique theme for this year's convention. The hotel has been christened the "S. S. Bedford Springs" and society members have been urged to come aboard for a luxurious cruise through South American waters to romantic Rio and return. The convention committee has surrounded the three-day convention with a festive cruise atmosphere. Three nights of merry making and dancing to American and South American orchestras; a gala cocktail party; a professional dance team to brush up the cha-cha and mambo; a captains party featuring world famous Dr. Giovanni and the Beach Combers; a carnival night in Rio with the internationally famous Ciro Rimac revue, singing, swinging and soaring to new heights of dancing rhythm and beauty; plus a deluxe 18 hole golf course; tennis; horse back riding and badminton all crowded aboard for your cruising pleasure.

Mrs. Ann Charles, woman's auxiliary chairman, announces an exciting program planned for the wives of attending optometrists. A president's luncheon will be followed by a fabulous fur show. A professional flower arranger will show the best way to arrange bouquets. Golf, bridge, indoor swimming and tennis will add for hours of relaxation with an added convenience of a "Stowaway Cabin" for the ladies.

Optometrists are urged to send now for their "Stateroom Reservations." Address your inquiries to Dr. Eugene Gould, 222 Market Street, Kittanning, Pennsylvania.

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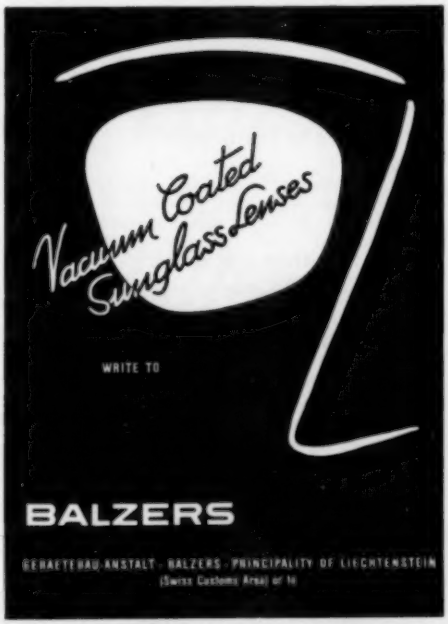

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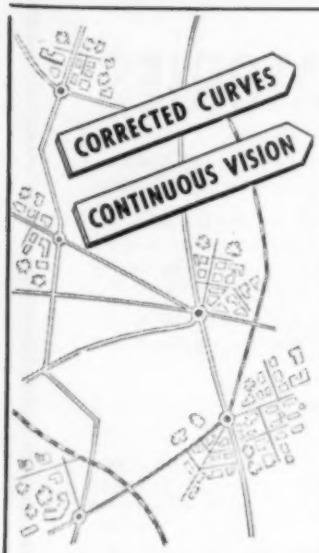

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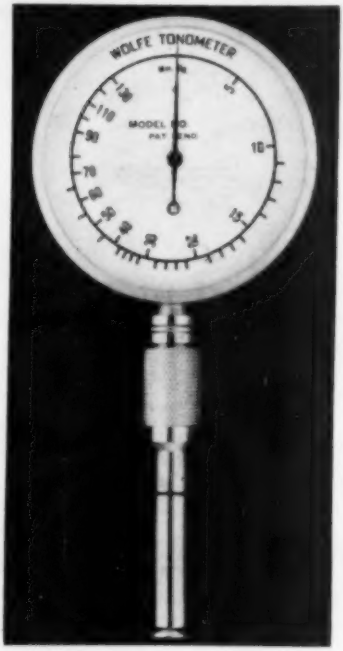

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